THE IRON AGE

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Practical Facts in Heat Treating Steel*

What Must Be Considered in Heating, Quenching and Tempering Explained by the Problem of Hardening Gears—The Kinds of Furnace

BY R. A. MILLHOLLAND

Now that the smoke of battle has lifted to some extent and the war over the merits of Bessemer, open hearth, and alloy steels have to some extent abated, it behooves the manufacturer to profit by the discussions of the controversy and to choose the materials that in his judgment are best adapted to his individual needs.

The automobile manufacturer has placed the use of steel in a new light. Heretofore mechanical construction has been based on the minimum physical properties of materials used in the fabrication of the machine. Automobile manufacturers came face to face with difficulty at this point. If automobiles were designed and built on the basis of minimum physical properties of material, weight would reach such a degree that it would make motor cars almost an impossibility. In desperation the manufacturers appealed to the steel manufacturers for aid and they in turn called upon their metallurgists for a way out of the dilemma.

AUTOMOBILE MAKERS ONCE ALLOY-STEEL MAD

The result was the discovery of the virtues of certain metals and their remarkable effect on steel. Nickel, chromium and nickel, chromium alone, and finally the vanadium steels were developed. For a while then automobile manufacturers went alloy-steel mad. Everything imaginable was made of alloy steel. We can all remember the day when motor cars were considered the playthings of the ultra rich, and what made them so? Alloy steels for one thing. When you stop to consider that 60 per cent. of the total cost of a motor car is material and alloy steels are nearly 60 per cent. more costly than ordinary steels, it can be easily seen why the motor car used to be considered such an unattainable luxury.

Of course the sudden demand for high-grade steels naturally set up a wholesome business rivalry among the various steel makers. They gave their metallurgists every facility for bettering their products. Men of brains and shrewd reasoning powers concentrated their efforts on improving steel for motor car construction. It was out of this intense concentration and effort that the value of heat treating steel gradually rose into prominence. Without attempting to settle absolutely and uncompromisingly the superiority of alloy steels over the straight carbon steels, the writer merely desires to set forth what has been his experience in the past with all of the various steels used in modern manufacturing and the heat treatments that will develop the maximum physical and dynamic qualities of each individual steel. Particular stress will be laid on the steel best adapted to the various parts of modern machinery. The true purpose of this article is to demonstrate of what real value heat treatment is to steel with the ideal in view of using the most economical steel consistent with the duties required of a given part. Heat treatment is the key to the entire situation. In many cases cheaper grades of steel can be substituted in place of expensive alloy steels, simply by applying scientific heat treatment and commonsense.

THE PROBLEMS OF HEAT-TREATED GEARS

Up to within the last ten years the hardening of gears had been an almost unheard of operation. True, some forms of gears where accuracy and silence were not essential, were hardened, but as a general practice the hardening of steel gears was unknown. Since the advent of high-speed steel and the motor car, the practice of hardening all gears subject to wear has become a recognized practice in a variety of industries. Many manufacturers have plunged into the matter because they saw they must keep up with progress and their competitors. Nearly every steel company and every chemical carbonizing compound manufacturer has put out literature on the subject. Some steel makers have made valuable suggestions and some of the information passed out so freely by the carbonizing compound people is really of some value, but they all miss the mark, as all of us who are confronted with the modern heat treating problems are aware to our own discomfiture. In the first place, neither of the foregoing industries have even a speaking acquaintance, we might say, with gear making and hardening, and any information they get is usually second hand; nor can we censure them in any way for not furnishing us with specific information. Therefore, if we want information regarding gears we must do one of two things, go ask the other fellow who makes them, and run the risk of being purposely misled or refused, or else experiment intelligently and find out.

TO THE BIT-ONCE-SHY-TWICE TRUTH SEEKERS

As every man knows who ever heated a piece of steel red hot, there are no two heating furnaces

*All rights reserved by R. A. Millholland, who is heat treating engineer of the Lyons-Atlas Company, Indianapolis, successor to the builders of the Atlas steam engines and now manufacturer of Diesel oil engines and motor cars. The author's observations are based on five years of experiment, research and study.

that behave exactly alike; in fact, there is so much variation that if I were to start talking in numbers of degrees Fahrenheit or Centigrade there would be a number of us bit-once-shy-twice seekers after truth who would stop reading right at this point in the article. So listen well to what I now say for my entire article from henceforth is based on this principle, which I find to be the only safeguard.

I have discovered in my experience that before ever subjecting a finished gear to a trial heat, hoping against hope that it will come out in a usable condition, it is best to run a series of test pieces through the various operations through which you intend to run the gear. Yes, test pieces are the best means of checking up the correctness of the heats of your furnaces. Whether you have a pyrometer equipment or not, test pieces should always be run to tell you whether your pyrometers are reliable, and just what is the true condition of the steel you are using. The simple inoffending innocent scrap of steel that was cut off the end of your gear stock is more truthful than a furnace room full of pyrometers. In other words, *the treatment of a given piece of steel should be governed by the behavior of the test piece cut from the bar.*

OIL-HARDENING GEARS

Now let us get back to gears. There are two distinct methods of producing hard gears. One method is commonly known as oil hardening, which really amounts to using a high-carbon alloy steel and heating the gear to the hardening point and quenching the gear in oil. The gear becomes hard as the heart could wish, and in many cases answers very well. The other method is the case hardened or case carbonized gear as some see fit to call it. This latter method is no doubt the better of the two; though more elaborate and costly, it has proved its superiority for heavy duty and strength combined with durability.

Since we mentioned the oil-hardening method first, let us give it our first consideration. The steel used in oil hardening gears is usually an alloy steel, either chrome vanadium, chrome nickel, nickel or chrome steel. The carbon content varies from 0.40 to 0.80 per cent. and in a few cases 90 points carbon, depending on the hardness desired. In the chrome vanadium steel the chromium runs about 85 to 100 points, or chemically speaking from 0.85 to 1.00 per cent. The nickel-steel oil-hardening gears run in the neighborhood of 40 to 60 points of carbon and 3½ to 5 per cent. nickel. Chrome nickel steel is much the same save that about 1 per cent. of chromium is added. The chrome steel generally runs higher in carbon than the others; frequently it is found up to 90 points carbon. It is little used for gears, though in the writer's opinion it has some admirable qualities where extreme hardness is desired.

STOCK FOR MACHINING MUST BE ANNEALED

The first rule to lay down in making hardened gears of any description whatsoever is: use *annealed* stock in machining the parts. Do not imagine that because the tools will cut into the stock that it is annealed. This is especially applicable to drop forgings or even hand forgings. Anneal all drop forgings and hand forgings, and also all bar stock before attempting to machine. The metal has been disturbed by violence, and strains result that will show up in hardening and cause the gears to come out warped and egg shaped if not properly annealed.

The simplest way to relieve all forging strains is to heat the forging gently in a furnace up to a very soft low red (1400 to 1550 deg. F.). When thoroughly saturated with heat, allow the furnace to cool until the red is barely visible. Hold at this temperature for a considerable length of time, governed of course by the size and weight of the forgings. Forgings weighing a pound or less can be removed after a half hour's heating. Large forgings weighing 5 to 20 lb. are frequently held at an annealing temperature for 3 to 5 hr. Allow the forgings to cool either in the furnace or in a place that is free from drafts. The writer has tried in the past innumerable formulas, both secret and otherwise, for annealing these particular kinds of steel, and he has always found this method superior to any other. It is a copy, with a few modifications, of an eastern steel mill's practice.

SHARP CUTTING TOOLS AND THEN REANNEALING

The next precaution to take and one the writer urges strongly to observe is: Don't attempt to "hog out" the gear with dull tools. Keep the cutting tools sharp and free cutting and avoid heavy cuts on thin walls and sections. Between the roughing and finishing operations it is best to reanneal the gear to relieve the strains set up by removing the skin from one side of the forging at a time. Steel, like cast iron, has a surface tension in its skin or scale, and it changes shape when that skin is disturbed. The skin acts as an envelope holding the steel under a perceptible compression, much similar in principle to the bands about a bale of cotton. Breakone band and distortion immediately occurs. Therefore, after the skin has been removed from the forging, reanneal.

The second annealing process is much simpler than the first. It consists of heating the gear slowly to a very low red, approximately its hardening temperature, and allowing it to cool in the air. The metal adjusts itself to the new condition at a slightly lower temperature than those at which hardening takes place. The gear may then be finished and is ready for the final treatment, i. e., hardening.

HEAT TREATMENT WITH THE TEST PIECE

If the steel has been treated properly through the operation just described, the greatest difficulty is over and the ensuing treatment will be so simple that the results obtained are surprising. Here is where the test pieces will come into use, as follows: Select the portion of the furnace that has the most uniform temperature, for if you have a uniformly heating furnace you are a fortunate individual indeed, and if you have a pyrometer which you are reasonably sure is reliable attempt to get the "fire end" as near the spot where you intend to harden the gear or gears. Raise the temperature of your furnace to full red heat (1550 deg. F.) and cast in your test piece and allow it to heat slowly until it attains the temperature of the furnace. Never depend on "catching it on a rising heat"; you will fail nine times out of ten. If the steel is chrome vanadium or straight chrome steel, this temperature is ideal; for chrome nickel drop to 1500 deg. F., and for straight nickel drop to 1475 deg. F.

After the test piece has soaked up all the heat it can, remove it quickly and quench in a light oil —fish oil, cottonseed oil or a very light automobile cylinder oil. Allow to grow *cold* in the oil. Why? One word answers that query, "cracks." The steel is likely to crack, if the density of the cooling medium is materially altered. Now draw the test piece to 360 deg. F. in an oil bath. This can be done very easily with the aid of the ordinary mercury thermometer. Do not trust an electric pyrometer for such low temperatures. When satisfied that

the test piece is thoroughly heated, remove it and allow it to cool off in the air for a few moments and then check in coal oil. Sprinkling sawdust over the piece and brushing it off again will absorb any excess of oil and kerosene and make the piece presentable for inspection.

The next step is the fracture. For gears, the impact test is no doubt the most logical. The procedure is as follows: Clamp the test piece in a stout vise and take a light sledge and commence striking regular blows upon the free end of the test piece, increasing the force gradually. If your test piece is over ¼ in. thick and 1 in. wide, you will strike some pretty hard raps before the test piece breaks. Look then at the fracture; if there is a fine close grain that has no perceptible crystalline structure in the result, then the temperature is correct, provided, of course, that the test piece is of the required hardness. You will generally find your test pieces to run 5 to 10 points higher on the scleroscope than the gear will run. If crystals appear in the test piece, try two more test pieces, one 25 deg. higher and the other 25 deg. lower, and treat in identically the manner that the first one was treated. When you are thoroughly satisfied with the hardness, strength and toughness of the test piece, then turn your attention toward the gears, following as closely as you can the treatment given the test piece that proved satisfactory.

(To Be Continued)

EDWARD NASH HURLEY

A Manufacturer Member of the Federal Trade Commission

It has been said that the man who makes his money in the country and spends it in the city is a farmer, but that one who acquires money in the city and spends it in the country is a mere horticulturist. At any rate, the saying is current in Wheaton, Ill., that neighbor Hurley as a farmer is an A1 manufacturer of washing machines. Edward Nash Hurley, whom President Wilson appointed vice-chairman of the Federal Trade Commission, is more distinctly representative of manufacturing interests than his associates on that body. He has been well known in the Middle West as president of the Illinois Manufacturers' Association, a position he is now resigning to meet the requirements of his new duties. By avocation Mr. Hurley is a gentleman farmer with a taste for fancy livestock; by force of habit he is a commissioner, be it to Panama, South America or at Washington; by inclination as well as habit an everlasting worker.

EDWARD N. HURLEY

In the capacity of a public servant Mr. Hurley made an extended trip through the Latin Americas in 1914, a partial record of which may be found in his report to the National Foreign Trade Convention held at Washington, D. C., May 27 and 28, 1914, and in his extended report on banking and credit in Argentina, Brazil, Chile and Peru, which he prepared under the authorization of Secretary of Commerce Redfield for the Department of Commerce. This latter report in particular evidences a detailed study of commercial conditions, not alone in the countries of South America but in this country as well.

Mr. Hurley was born at Galesburg, Ill., July 31, 1864. Having finished the public school course, he took up railroading, becoming in time an engineer on the Chicago, Burlington & Quincy. In 1888 he became a traveling salesman for the U. S. Metallic Packing Company. His service in that connection continued for eight years, in the latter part of which he was manager of the company. About that time Mr. Hurley brought to the stage of marketing a pneumatic drill, and to promote its manufacture and sale he organized the Standard Pneumatic Tool Company, of which he was president and treasurer. This was in 1896. The Standard Pneumatic Tool Company continued its existence until 1902, when it was absorbed by the Chicago Pneumatic Tool Company and Mr. Hurley retired to his farm 25 miles west of Chicago, where he remained for two years without active business connections. Later the Hurley Machine Company, of which he was the organizer and president, was formed to engage in the manufacture of electrically operated household appliances, particularly the electrically driven washing machine. Mr. Hurley has been uniformly successful in his enterprises, the result of keen business intuition and untiring energy. He has a number of interests aside from his own company and is president of the First National Bank of Wheaton.

Change in Steel Jobbing Business

The William J. Walker Steel Company, Cleveland, Ohio, which has been incorporated with a capital stock of $20,000, will take over the business conducted under the same name by William J. Walker, who died recently. H. T. Bradley, formerly of Detroit, has become associated with the company as president and manager. Other officers are James T. Hunt of the Hunt & Dorman Mfg. Company, vice-president, and F. D. Walker, secretary and treasurer. G. S. Auer, of the Auer Register Company, is a director. The company will continue the jobbing business heretofore carried on in cold-rolled strip steel and flat wire, and in addition will handle grinding wheels. It is the intention to increase largely the volume of business, and larger quarters will probably be secured shortly when the lease expires of the quarters now occupied at 1722 Columbus road.

The Elyria Enameled Products Company, Elyria, Ohio, has been incorporated with a capital stock of $150,000 by Charles E. Wilson, John Murbach, C. E. Blanchard and others. The company proposes to take over the plant of the Enamel Pipe & Enginering Company, Elyria, which has been operating under a receivership. Its products include acid vats, pickling vats and various other receptacles. It is stated that several Pittsburgh men are associated with Elyria stockholders in the new company.

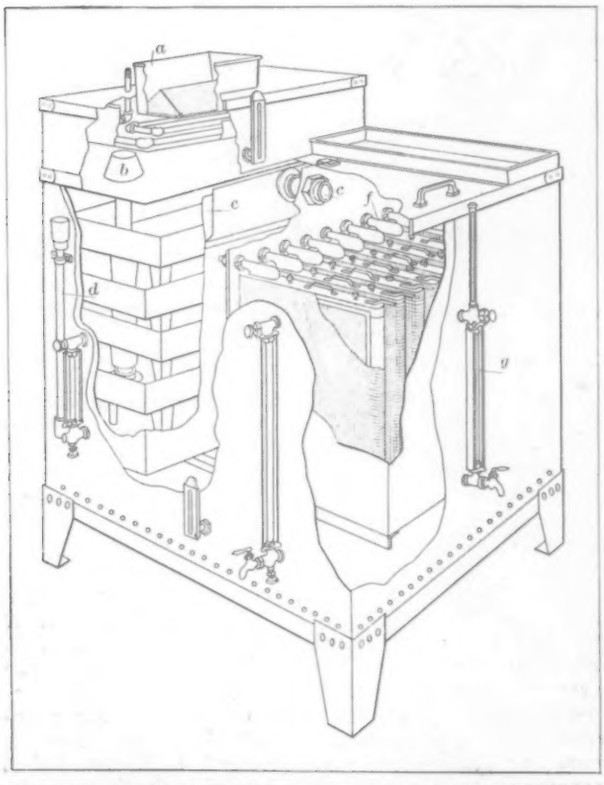
POWER-PLANT OIL FILTER

Heating To Facilitate Precipitation of Water and Vertical Filtering

A new type of oil filter for power plants has been placed on the market by the Richardson-Phenix Company, Milwaukee, Wis. Advantage is taken of the fact that heated oil has less viscosity than a cooler one and is not so likely to retain water and solid particles in suspension. The oil flows at low velocity over shallow trays where the particles in suspension are precipitated and is afterward filtered before passing into the storage compartment. Special emphasis is laid upon the fact that the only part requiring cleaning are the filter cloths which can be readily removed without interfering with the continuous operation of the filter.

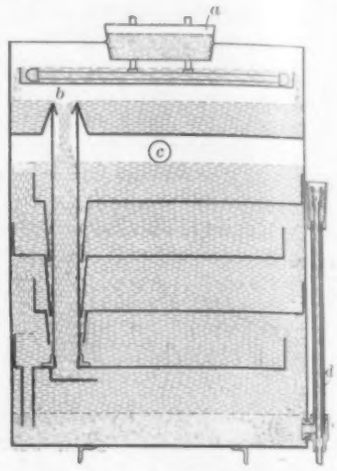
The body of the filter is constructed of No. 12 gauge galvanized sheet steel reinforced by channel and angle irons, the joints being locked, riveted and soldered. The filter cloth is cleaned by lifting out a unit, setting it in a pan of kerosene and brushing with a stiff brush to remove the sediment collecting on the outside of the cloth. It is pointed out that it is sometimes advisable to remove the cloth from the filtering unit and wash it in gasoline or kerosene.

In operation the dirty oil enters the filter through the strainer box *a*, passing down through removable strainer where large particles of foreign matter, such as waste, etc, are caught. The oil then passes to the heating tray directly underneath where its viscosity is lowered and then flows to the top compartment. It passes down through the funnel *b* and is spread out by the baffle under the bottom of the lowest tray. As the head in the conductor funnel increases the oil is forced to take a zigzag path, passing under and above the trays, as shown by the lines of flow. Then the oil passes out through the opening *c* to the filtering compartment.



Drawing Showing the Arrangement of the Precipitation, Filtering and Clean Oil Compartments

The water which separates from the oil collects in the bottom of the different trays and is by-passed directly to the bottom of the precipitation compartment through the channel surrounding the main conductor through which the oil flows into the filter. In this way it does not come in contact with the traveling oil and is automatically ejected by a water overflow tube, *d*, which consists of two concentric pipes. The water flows upward through the outer tube and falls over the top of the funnel. This is threaded and can be raised or lowered to give the necessary adjustment for oils having different specific gravities. The water overflow operates on the principle of a U-tube, the column of water in the outer pipe balancing a column in the filter which is made up of oil and water. As oil is lighter than water, the top of the overflow is located at a slightly lower level than that of the oil in the precipitation compartment. With an increased precipitation of water from the oil, the water level in the precipitation compartment tends to rise and the leg of the U-tube which is inside the filter becomes heavier, due to the fact that the proportion of water in it is increased. This causes water to flow over the top of the funnel until the two legs of the U-tube again balance, this arrangement being relied upon to maintain the low water level of the precipitation compartment automatically. The skimmer *e* maintains the oil in the top tray at a constant level. From here it flows through the pipe *c* into the filtering compartment which contains nine non-collapsible filtering units. The oil passes from the outside to the inside of the units and then out through the nozzles *f* which project through the wall of the filtering compartment to that in which the clean oil is stored. The nozzle on each filtering unit fits into a spring actuated valve so that any individual unit can be withdrawn and cleaned, it is emphasized, without interfering with the continuous operation of the filter. The withdrawal of a filtering unit is relied upon to close the valve associated with it instantly and thus prevent unfiltered oil from flowing into the clean oil compartment.



Cross-Sectional Elevation of the Precipitation Chamber Showing the Path Taken by the Oil That Is Being Filtered

One of the features upon which special emphasis is laid is that the filtering cloth is arranged so as to be free from folds, thus making every portion active in filtering the oil. No oil can pass to the clean oil compartment until the level in the filtering compartment reaches that of the outlets *f*. In this way it is pointed out no filtering takes place until every square inch of the cloth is submerged in oil. As soon as a slight head builds up over the outlet, the process of filtration commences and is distributed over the entire surface, every portion of which is subjected to equal pressure. The filtering medium is a cloth that filters the oil largely by capillary action instead of serving as a screen. The placing of this cloth

in a vertical position and having the oil pass from the outside to the inside is an advantage, it is emphasized, as the slime and sediment collecting on the cloth, continually work toward the bottom and drop off, thus automatically tending to keep the surface clean.

The head of oil over the filtering units is shown by the indicator at the top of the gauge *g* which should show a level of approximately 3 in. when the filter is being operated at its normal rating. A greater hight indicates that the oil is not passing through the cloth as rapidly as it should and one or more of the filtering units need cleaning. The filters are rated at a head of 3 in. above the filtering units, although space is provided for carrying a 6-in. head. In this way it is possible for the filter to handle short overloads of 100 per cent. such as might occur if a large batch of oil were run in.

Gauges are provided for showing the water level in the precipitation compartment which should be as low as is practical and the oil levels in the clean oil and filtering compartments, the last of which should be kept filled with oil at all times. Sheet metal guards with white enamel on the inside are placed in back of the gauge glasses with a view to protecting the glass from breakage and also enabling the oil level to be seen at a distance. The cock on the fitting at the bottom of the clean oil level gauge provides a means for filling cans for hand oiling. Thermometers are provided for showing the temperature of the oil before it enters the precipitation compartment and also that of the oil in the storage compartment, and the engineer adjusts the quantity of heat to maintain the desired viscosity.

Graphite and Strength of Castings

The deleterious effects of graphite were emphasized by Dr. J. E. Stead in a recent lecture in Birmingham, England, on "Some Scientific Features of Cast Iron." He described graphite as the enemy of the foundryman and likened it to thin plates of mica which can be split along their cleavage planes with the utmost ease. He summarized the results of a large number of tests, undertaken with a view of ascertaining the influence of graphite on the strength of castings, in the following table:

Graphite, per cent.	Transverse strength, cwt.	Tenacity, tons
3.00 to 3.25	20.4	8.25
2.60 to 2.85	27.1	13.24
2.15 to 2.55	31.9	14.54
2.00	40.0 above	17.10
None, with 3 per cent. silicon.	91.0	88.60

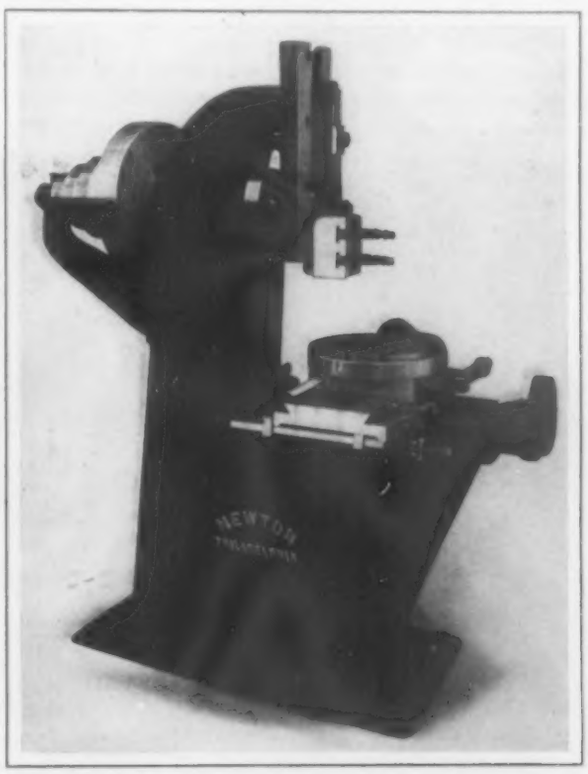
He deprecated the rule-of-thumb practice which has led foundrymen to adopt a hostile attitude towards types or grades of pig iron with which they were unfamiliar, citing the case of some irons of superlative quality which were unsaleable and had to be reinserted because their fracture presented some unusual features. He argued that any class of iron could be made to yield the results desired if only it were "mixed with brains"; that even sulphur, sometimes considered the foundryman's worst enemy, could be turned to useful account if intelligently handled. This element should rather be regarded as a friend, said Dr. Stead, because it prevents the carbide from parting with its graphite.

Steel plates coated with three different thicknesses of cement immersed in sea water for three years near the drydock at Mt. Hope, Canal Zone, Isthmus of Panama, show that the 1-in. did as well as the 1½-in., that none of the coatings afforded sufficient protection to steel to insure the permanence of structures dependent on such protection; but that the life of such structures would be considerably prolonged by coating with cement only ½ in. thick.

A New Special 5-in. Slotting Machine

A new design of slotting machine having a stroke of 5 in. has been brought out by the Newton Machine Tool Works, Inc., Twenty-fourth and Vine streets, Philadelphia, Pa. The work that this machine was especially designed to handle is the finishing of the breech mechanism on army rifles, although it can also be used for toolroom work where a high speed of the cutting bar, ranging from 30 to 120 strokes per min., is required.

The table measures 12 in. in diameter over the T-slots, while the over-all diameter is 3 in. greater. Power feed is provided in all directions and is controlled by a friction clutch. For convenience in making duplicate parts a set of stops is furnished. The in and out traverse is 10 in. and the cross traverse is 11 in. The hight under the frame is 9 in. The cutting bar is provided with a relief tool apron and the maximum distance under the apron is 15 in.



A New Design of Slotting Machine with a 5-In. Stroke Designed Especially for Finishing the Breech Mechanism on Army Rifles and also for Toolroom Work Where from 30 to 120 Strokes per Min. of the Cutting Ram Are Required

If desired, a turret tool holder and ram slide that can swivel to a maximum of 10 deg. on either side of the vertical position can be furnished.

An Iron-Boron-Carbon-Copper Alloy

An alloy that is practically non-corrosive and which, though hard and tough, may be rolled to sheet form or readily machined without being annealed, is covered by a patent recently issued to Edward D. Gleason, Brooklyn, N. Y., and assigned to the Neu-Metals & Process Company, Long Island City, N. Y. It is an alloy of iron, boron, carbon and copper. The boron is first incorporated in the copper so as to be in excess of the amount that will combine with copper. As the boron associates with iron as readily as silicon, regardless of the carbon content of the iron, the copper is thus caused to alloy with the iron and carbon, forming a homogeneous mixture. By taking 80 parts of Bessemer scrap and fusing it in a furnace and adding 20 parts of copper containing boron in excess, an alloy is produced which may be cast in ordinary sand molds forming castings homogeneous and easily machined.

Studebaker Corporation Gray-Iron Foundry

Arrangement of the Foundry at South Bend, Ind.—Methods of Handling Materials and Product—The Organization in Brief

The Studebaker Corporation of America does at South Bend, Ind., all of the gray-iron foundry work for both the wagon and carriage works and for the Studebaker automobile plants at Detroit. The foundry is situated advantageously on the Grand Trunk Railroad about ¾ mile from the main plants of the corporation. The location was chosen for its shipping facilities, together with liberal yard space and an opportunity to spread. The following interesting information concerning the design and operation of the foundry has been obtained from R. L. Sackett of the Studebaker Corporation:

The part of the foundry yard used for pig iron storage is divided into three parts by two spurs of standard gauge track connecting directly with the railroad through one of the yard gates. Industrial tracks run down the center of these divisions and lead to the elevator which feeds the cupola charging room. They have been built upon made land and are so graded as to require but little assistance to gravity in moving loaded cars of pig and scrap. The unloaded cars can easily be moved up this gradient. The industrial railway cars are fitted with dust proof roller bearings, the trackage connecting all parts of the foundry from the yard to the shipping room.

All cars bearing charges for the cupola are weighed by passing over a track scale before running onto the elevator to the cupola charging floors. The proportion of different kinds of pig, the analyses of which have been previously determined, is given to the foreman in charge of the cupola loading floor by the superintendent. The superintendent also determines the amount of steel and cast-iron scrap to be used. At the present time the plant is running about 65 tons daily, this being handled very nicely by one cupola. Duplicate equipment is provided to guard against accident to one cupola.

Several different qualities of iron are being run through the cupola daily, varying from soft gray iron used in wagon hardware and some of the automobile castings, to iron suitable for automobile cylinders. Information furnished by the chemical laboratory from test specimens taken daily of different portions of the run has made it possible to get almost exactly the desired analyses for the different classes of castings. Test bars are poured off daily for the physical testing laboratory, which is located at the foundry itself. Tensile strength and fracture are observed by the superintendent as an immediate guide. Chemical analysis serves to check up his conclusions when received later in the day. A close check is thus maintained to remove the chance of question that castings made on a certain day were up to the engineer's specifications.

Making Sand Molds for Cylinder Castings; Mold Dryer in Background

The foundry proper is divided into three main floors. Automobile cylinders, crank cases, flywheels, manifolds, transmission case covers, pistons, etc., are made in the west bay. Wagon hardware and such miscellaneous castings as are used in building any special types of vehicles are made in the central

bay. Regular wagon boxes and skein work is carried on in the east bay, and the castings are made on molding machines of Studebaker design.

The western bay of the foundry, taking the most cores, is near the coremaking department, which is located in an adjacent building. Raw material is delivered to the north end of this department and is mixed into the various kinds of core sand mixtures in the next room south. The core makers occupy the next room, and the finished cores are taken on cars on cross tracks to cars on a depressed track which conveys the loaded cars to a point in the next room south, opposite the ovens. The loaded core cars are then run directly into the core ovens, no rehandling of cores or plates being necessary. Cores are stored after baking on the west side of the oven room, and are delivered to the molders only in such quantities as the schedules on which the different floors are running necessitate.

On the second floor of the core making department are numbers of girls who make light cores. A small elevator running as a dumb waiter conveys sand to this floor and returns the finished cores to the floor below where they are baked. The distribution of sand, plates and all other heavy work is taken care of by a laborer who serves this department. Suitable rest and toilet rooms are provided so that it is not necessary for the help employed in this department to enter the factory proper.

Adjacent to the core ovens but facing into the bay in which the automobile castings are made, are three large ovens which are used for drying out dry sand molds. A large amount of this work is being done in connection with automobile cylinders and crank cases. Ovens are loaded in the afternoon and part of the morning, heated at night and unloaded the following morning.

In the southern end of the west bay are located the pattern shop and pattern storage rooms.

The foundry office, which covers the office of the superintendent, his assistant and the clerical force, is located on the passage way between the western and central bays of the plant about equidistant from points these men have to visit often.

The air is turned on the cupola about 1:30 p.m. and the blast is left on until about 4:30. The molders pour their own floors in team with their helper, or in two teams on large work, or singly as the case may require, and in every case where possible when through pouring they shake out their own floor and pile their flasks and follow boards. Such castings as cannot be shaken out at once are taken care of in the night by a force of men, who shake out molds, pile flasks, wet down and temper sand, etc., preparatory to the next day's work.

All castings from each floor are piled adjacent to the industrial railway tracks from which point they are placed on cars and taken to the rattler, if small castings, and to the sand blast room if they are castings which cannot be handled in a tumbling barrel. These men take return car loads of sprues, gates, etc., from the cleaning room to the cupola charging floor, first weighing them in as described.

After castings have passed through the cleaning process and have been inspected for superficial defects they are placed on the industrial cars and conveyed to the store room from which point they are shipped to Detroit or other points in carload lots, made up according to schedules. The shipping and storage facilities are excellent, so that it is possible to run the foundry on what is found to be the most economical quantities. The freight cars are backed directly into the store room and loaded under cover. This also is a big advantage, as a number of the castings have to have special treatment or inspection, such as automobile cylinders, which are given a thorough water test before shipping. Owing to the volume of business and a large variety of sizes and types of skeins and boxes for the wagon trade, a large stock of these parts is carried as a protection that immediate shipments can be made of a reasonable quantity of any size or style.

The Cars Used for Charge for Cupola

Adjacent to the store house and feeding into the portion in which skeins and boxes are stored, is a room in which such machine work is done as turning and threading the ends, tapping the nuts, etc.

The general supervision of the foundry organization is taken by the superintendent. The only other portion of the work to which he gives his personal attention and with which he will trust with no one else, is furnishing the charging-floor foreman the data for his daily run of metal and employing and discharging the help. Directly under the superintendent is his assistant. The various foremen of the different departments, such as core making, cleaning, automobile castings, box and skein castings, skein machining, stock room, shipping, pattern shop, yard and labor, report directly to the superintendent, who is thereby kept in touch with the conditions in all parts of the plant at all times. Each foreman is given a book containing a schedule of the production which is expected from his particular department, the number of men that it is expected this production will be obtained with and the prices which may be paid for the different jobs. The planning is done for them as far as determining what shall be made and how many; this enables them to devote their entire attention to the problems of production itself. In addition to this a record is kept of the amount of controllable expense incurred by each department monthly. This report enables the superintendent to check and stop many leaks.

Nickel-Plating Aluminum

The successful nickel-plating of aluminum is announced by M. Le Chatelier in a recent communication to the Académie des Sciences. This has not been accomulished heretofore by ordinary methods. The new process consists in a preliminary scouring of the aluminum in a bath of hydrochloric acid containing a certain portion of iron. The iron is precipitated on the surface of the aluminum forming a kind of network. When this is passed into a nickel bath the nickel becomes entangled in this network and adheres strongly to the aluminum. This process is based on a physical action and appears to solve the problem, hitherto considered impossible.

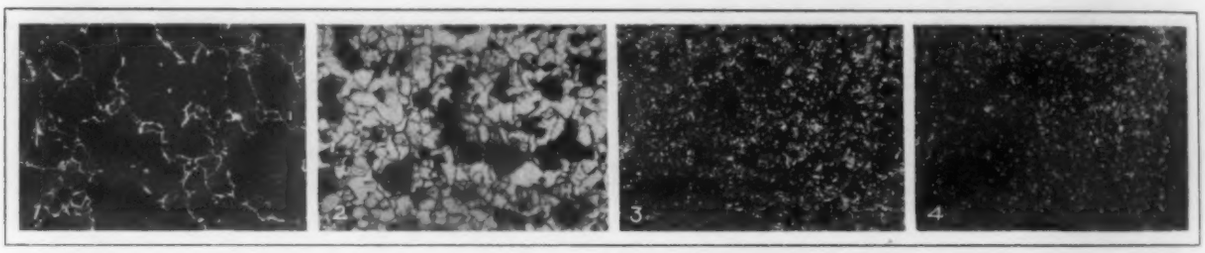
The Structure of Carbon Tool Steel*

How Its Qualities Depend Upon Proper Crystalline Refinement—Causes and Remedies of Ordinary Defects

BY J. V. EMMONS

Some time ago the author bought a pocket knife from a large hardware firm. He paid enough for it to insure, as he thought, a good knife. After trial, he discovered that one of the blades was so brittle that large pieces could be broken out of it with the thumb nail. Upon returning it, the knife was at once replaced with another similar in appearance and of the same make. One of the blades of this knife was so soft that it could be bent over at right angles without breaking. The knife being replaced a second time, he received one that has been the best that he has ever carried.

An examination of the two defective knives revealed that the first had a structure similar to Fig. 1, the long coarse lines of which greatly weaken the steel. The second knife, with the soft blade, had a structure similar to Fig. 2, in which the carbon is all in the form of graphite, serving no useful purpose. This structure is almost exactly like that of malleable cast iron. The good blade has not been examined, but it undoubtedly has a structure like Fig. 3, in which the fine uniform condition shows clearly the quality of the material. Yet these three knives, under ordinary examination, appeared exactly the same. Furthermore, the chemical analysis of each is undoubtedly similar, the difference in quality being purely a matter of the different arrangement of the various chemical constituents, or in other words, the structure.



Photomicrographs of Carbon Tool Steel. Fig. 1 Shows the Structure of a Brittle Knife Blade and Fig. 2 of a Soft Blade, Both Caused by Defective Heat Treatment. Fig. 3 Is the Proper Structure of Correctly Treated Carbon Tool Steel. Fig. 4 Reveals the Proper Crystalline Condition of Carbon Tool Steel Before Hardening or in the Condition of the Annealed Blocks or Bars.

Tool steel ordinarily contains from 0.60 per cent. to 1.75 per cent. carbon. The principal constituents of hardened tool steel are martensite and cementite. Hardened and tempered tool steel contains two other constituents, troostite and sorbite, which are softer and tougher than the martensite from which they are derived by tempering, but still much harder than pearlite. The process of manufacture of a tool steel product is one of refinement of structure. In the steel mill the ingots are first inspected, graded and the pipe in the top broken off and discarded, then reheated and hammered or rolled to a billet. This hot working breaks up the coarse crystals and refines the structure very appreciably. In the structure of a high carbon billet the grain size is still large, but much superior to that of the ingot as cast.

REFINING THE STRUCTURE

After the billets have had the surface imperfections chipped or ground out, they are again reheated and forged or rolled to a block, plate or bar, according to the purpose for which the steel is intended. This working, which is usually at a lower temperature than the previous one, results in a still greater refining of the grain size.

The steel is now in the form in which it is received by the tool maker, but before it can be machined, the structure must be still further refined in order to give it softness and put it in proper condition for hardening. This is accomplished by a carefully regulated annealing. This annealing consists of heating the steel to a temperature above its critical point, usually about 1450 deg. F., and cooling very slowly. This treatment breaks up the coarse network which has been such a prominent feature of the several stages shown before, and substitutes a very fine granular structure like Fig. 4 in its place.

Steel in this condition is now ready for machining and hardening. The last stage in the series of refining processes is hardening. The principal structural changes which take place on hardening are the change of pearlite to martensite, the absorption of all ferrite present, the absorption of part of the free cementite and the breaking up of the remainder into smaller sized particles. In the case of a low carbon steel, these changes produce on amorphous mass of martensite in which even the highest powers of the microscope find it difficult to distinguish a structure. In a high carbon steel, the martensite mass is thickly dotted with small particles of cementite.

The final heat treatment of drawing the temper results in a change of a portion of the martensite to trootsite and sorbite, toughening the tool and reducing its hardness, but not affecting the degree of refinement. This structure is the one which will be present in all high grade tools which have been properly hardened.

In the preceding series of operations for the refining of the structure of tool steel from the ingot to the finished tool, each operation may be assumed to have been perfectly done. In the manufacture of tool steel products on a large scale, there is opportunity at every turn for defects to creep into the steel and all unseen by the ordinary eye remain to undo the work of the most skilled mechanics. The microscope has been shown to be by far the most useful means of tracing these hidden flaws to their true source. It also, in many cases, points out the cure or the means of eliminating the harmful condition.

*From a paper presented before the Cleveland (Ohio) Engineering Society and printed in the society's March Journal. The author is metallurgical engineer of the Cleveland Twist Drill Company.

DEFECTS IN TOOL STEEL

Defects in tool steel may be divided into three classes:

Those which originate in the casting and hot working operations of the steel mill.

Those resulting from annealing.

Those resulting from hardening.

Mill Defects.—In the mill, the first structural defect which may occur in tool steel is the formation of a pipe or shrinkage cavity in the center of the ingot. This pipe may be closed over at the top of the ingot and so not being discovered, rolled down to the finished bar. In the absence of proper inspection, it may even progress as far as the hardening operation unsuspected. There it makes its presence known by splitting the tool open along its entire length as soon as it is cooled in the quenching bath.

Laps, seams and bursts are other defects caused in the mill and are usually visible to the naked eye. Fig. 5 shows a slight seam which has become a still more serious defect through decarbonization.

Segregation of the carbon is a defect which occurs in the mill, either by prolonged soaking in the reheating furnaces or insufficient hot work. The carbon in the form of cementite instead of being uniformly distributed through the steel, becomes collected in large groups or masses. These masses, as the steel is rolled out in the form of bars, are drawn into long streaks or strings which are a serious form of weakness in the steel. Fig. 6 shows a cross section and a longitudinal section of a bar showing this segregation.

Too high temperature of finishing under the rolls or hammers may leave the steel in too coarse a condition to be refined by any ordinary annealing or hardening methods. This is one of the commonest defects in steel as it comes from the mill. Steel in this condition, Fig. 7, will harden with a coarse crystalline fracture and will be liable to firecrack.

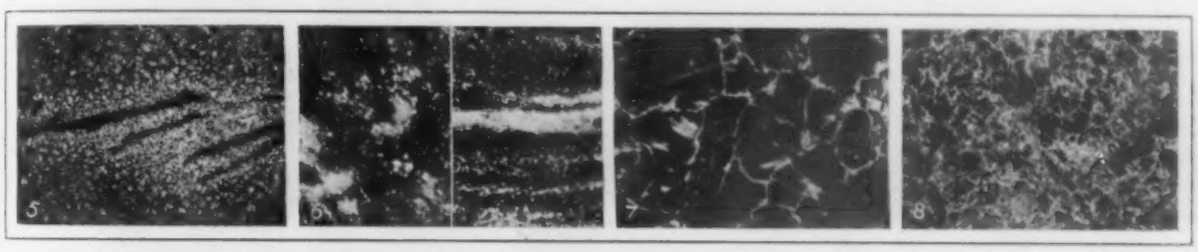
Annealing Defects.—The annealing of tool steel is sometimes done by the mill and sometimes by the tool manufacturer. If the heat is not sufficiently high, or if the time is not long enough, the coarse structure will be incompletely broken up, with a result like Fig. 8. This would make a tool very likely to chip and of poor wearing quality.

A very serious defect, which is sometimes caused by annealing, is the formation of graphitic carbon. This condition is produced by a prolonged annealing at low temperatures. The carbon is thrown entirely out of combination with the iron and assumes the form of graphite. When this change has taken place, the tool steel is no longer steel, but a very excellent grade of cast iron.

Hardening Defects.—In considering the defects which may be due to hardening, we should not forget that too often the hardener gets the blame for all the mistakes which may have been made on the steel before he gets it. The most common defect due to hardening, is overheat. When a piece of perfectly annealed steel is overheated, the coarse crystalline structure which the steel mill has gone to such great trouble to break up, is again given a chance to grow. The larger this structure is allowed to become, the greater the damage done to the steel. A few minutes' carelessness by a hardener may thus undo many days' work of a careful steelmaker. Underheat in hardening, of course, results in a soft tool with little change of structure. Uneven heating and heating for too short time result in uneven hardening with great danger of firecracking. Heating for too short or too long a time may also cause distortion of the tool.

DECARBONIZATION OF THE SURFACE

One of the commonest defects in tool steel has not been classified above, because it may occur at any time the steel is heated above its critical point. This is the decarbonization of the exposed surface which is commonly known as the bark or skin on tool steel. This defect is present to a greater or less extent on all tool steel and must be removed by machining. It is caused by the exposure of the steel to the air or other oxidizing conditions while heated to a high temperature. The result is the removal of the carbon from the surface and often penetrating to a considerable depth. Taking for example in a 1.25 per cent. carbon steel, the outside of the steel has been reduced to pure iron. Below this is a band of steel or low carbon, then a band of steel of about 0.80 per cent. carbon, then the 1.25 per cent. carbon of the interior. This bark or decarbonized surface, if not completely removed, will result in soft spots and poor cutting qualities in the hardened tool.



Photomicrographs of Defective Carbon Tool Steel. Fig. 5 Shows a Slight Seam Rendered More Defective by Decarbonization. Fig. 6 Shows Both the Cross and Longitudinal Section of Segregated Carbon in Tool Steel. Fig. 7 Shows Coarseness Caused by Too High a Temperature in Finishing Under the Rolls or Hammers. Fig. 8 Reveals the Incompletely Broken up Structure of Insufficient Temperature or Time in Annealing.

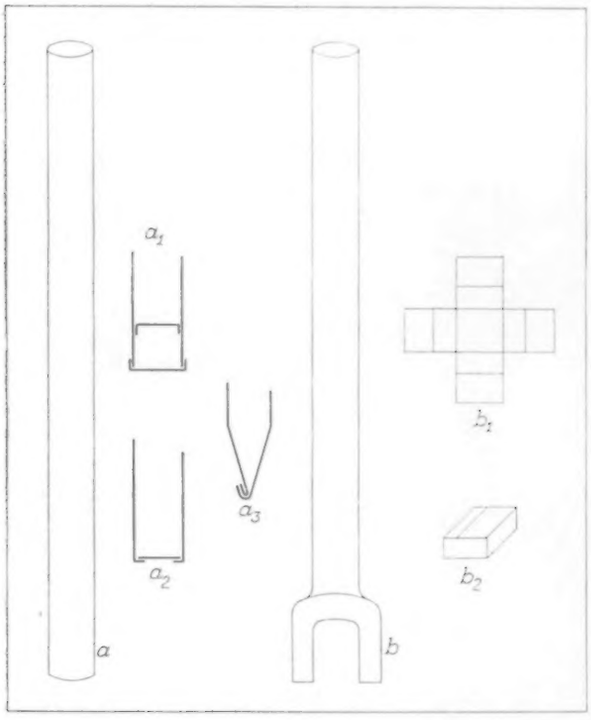
These structural defects are, with a few exceptions, not visible to the naked eye, yet upon their successful prevention depends the quality of the tool. A finished tool containing such a defect might be likened to a bridge which, perfect in every other detail, is built upon an unsafe pier. The entire structure may be instantly destroyed through the failure of a single member.

In the production of finished tools on a large scale, the most constant vigilance is necessary in both inspection of raw material and regulation of heat treatment, to insure that none but tools with a perfect structure may reach the customer. Even those that make and temper a few tools for their own use, find that inspection of the raw material and regulation of their heat treatments, repays many times its cost in the production of tools of increased efficiency. The increased use of the pyrometer in regulating the temperature of heating has been of immense value in promoting greater accuracy and uniformity. The introduction of the microscope for the inspection of steel and for research will result in still greater improvement. A finished drill or reamer bears no indication on its surface of its cutting qualities, but by the stern test of chemical analysis and under the searching eye of the microscope, its secrets stand revealed.

A Device to Introduce Deoxidants Into Molten Metal

An ingenious appliance for introducing deoxidizing substances into molten metals has been invented by G. B. Brook, of the non-ferrous department of Sheffield University, England. It is essential that, with the least possible delay, the deoxidant should be introduced so as to avoid loss, and it should also be allowed to react at the bottom of the pot or crucible so that it floods or scours the molten metal, either by mixing, or, if it has a lower specific gravity, by rising through the metal. The usual method is to throw the powdered deoxidant into the crucible. On account of the high temperature, a considerable waste of the deoxidizer thus occurs; in some cases it takes fire the moment it touches the molten metal, and in many cases it expends itself merely in the upper portion of the alloy.

Mr. Brook obviates these difficulties with the tool shown in the illustration. This tool consists of two parts: a round strong graphite rod terminating in a square forked end and a roughly made



Parts Comprising an English Device to Introduce Dioxidants into Molten Metals in Crucibles

copper box bent up from a thin copper blank the shape of a cross. The method of using the tool is as follows: The copper blank is folded up so as to leave one side of the box open, the deoxidant is introduced into the box, the remaining side folded over, and the box squeezed into position between the square ends of the graphite rod. The round portion of the rod is held firmly by means of half-round nose-ringed tongs, and the square end containing the copper box with the deoxidant is boldly plunged to the bottom of the molten metal contained in the crucible. The copper melts in the general body of the metal, releasing the deoxidant at the very bottom, where it is free to do its work thoroughly and quickly. With the use of such a tool it is possible to get sodium, which melts at the temperature of boiling water, or magnesium, which takes fire below a dull red heat, satisfactorily into the metal. Having thus introduced the deoxidants, their apparent disadvantage of lightness becomes, in fact, a powerful advantage, for the molten deoxidant rises rapidly through the metal. Referring to the illustration, a is a plain graphite rod; a_1, a_2 and a_3 are metal cartridges for holding the deoxidant or addition agent; b is a special forked graphite rod; b_1 is a simple template for making the boxes, b, which hold the deoxidant. This type of box is especially useful for adding material cut into blocks or cubes. The box or cartridge melts into the metal, and hence should itself be made of a constituent metal of the alloy which it is required to produce.

Guarding Employees Against Too Brilliant Illumination

In a paper read before a recent meeting in Pittsburgh of the Association of Iron and Steel Electrical Engineers, Stewart C. Coey, assistant superintendent of the electrical department of the Youngstown Sheet & Tube Company, called attention to the following condition in modern lighting:

In view of the recent developments in incandescent lamp manufacture there is danger to the eyes of having filaments of high intrinsic brilliancy within the field of vision. It is usually assumed that a light source of an intrinsic brilliancy of more than 6 candle power per sq. in., if allowed to come within the field of vision, has a detrimental effect on eyesight. The only sources of electric light falling within this limit of six candle power per sq. in. are as follows:

Moore Tube	0.3 to 1.75 cp. per sq. in.
Frosted carbon lamp	2 to 5 cp. per sq. in.

As a test of this point I believe the following rule is a safe guide. Any light source which leaves an after image or causes a blurring effect on the eye when an attempt is made to view immediately some other object after a short glance at the light source is too bright. I call your attention to this on account of the rapid increase in the intrinsic brilliancy that has come with the increase in incandescent lamp efficiency and especially because of the tremendous jump in intrinsic brilliancy from the ordinary tungsten lamp to the gas-filled tungsten, and unless the fact is borne rigidly in mind, eye trouble is going to result from the introduction of this type of incandescent lamp. Of course, while it is true that the flaming arc, with an intrinsic brilliancy of 5000 c.p. per sq. in., and the magnetite arc, with an intrinsic brilliancy of 4000 c.p. per sq. in., would, under similar conditions, be equally as bad on the eyes, the tendency to place these lights within the field of vision unprotected by an opaque globe is almost negligible, while the gas-filled lamps can easily be used in any available socket of the proper size.

When periodical examinations of all employees are made in iron and steel plants, the records obtained will show whether the eyesight of employees in general is being impaired by the light under which they are working. This will make it necessary for the men in charge of the installation of lighting systems to watch these records closely and adapt the conditions of illumination accordingly.

The process for spraying metals, involving a kind of pistol through which is fed a wire of the metal to be sprayed and in which the metal is melted and projected against the article to be covered, is to be described in a paper, accompanied with actual demonstrations, by John Calder, of the Metals Coating Company, at a meeting of the American Society of Mechanical Engineers to be held on the evening of May 11 in the Engineering Societies Building, 29 West Thirty-ninth street, New York City.

The Morse Engineering Company, St. Louis agent for the C & C Electric & Mfg. Company, manufacturer of electric motors and welding machines, Garwood, N. J., has moved to the Chemical Building from its former quarters in the Central National Bank Building.

Making Superheated Steam Gate Valves

Procedure Followed in Producing Large Fittings with Steel Bodies and Monel Metal Seats, Stems and Bonnet Bushings

The plant of the Cleveland Electric Illuminating Company has been recently enlarged and in connection with this work an order was placed with the Nelson Valve Company, Chestnut Hill, Philadelphia, Pa., for some of what are probably the largest Monel-metal-mounted superheated steam steel-body valves built up to the present time. The valves furnished under this contract ranged from 4 to 20 in. inclusive in size. Two of the 20-in. valves arranged for gear operation are shown in the smaller of the accompanying illustrations, the one in the middle being a 16-in. valve arranged for handwheel operation.

The steel used for the body, bonnet, yoke, wedge and gland has a tensile strength of 78,000 lb. and elongation of 26.5 per cent. in 2 in. It has an elastic limit of 45,000 lb. and the coefficient of expansion is 0.00001144 for each degree C. The Monel metal that was used for the stems, seats, disk rings and bonnet bushings has an ultimate tensile strength of 75,000 lb., an elastic limit of 30,000 lb. and an elongation of 40 per cent. in 2 in. The coefficient of expansion is 0.0000-1375 per deg. C. It will be noticed that the coefficients of expansion of steel and Monel metal agree quite closely, and for that reason practically no movement between the steel and Monel metal parts will result by reason of the severe expansion and contraction stresses to which the valves are subjected.

Three Large Superheated Steam Steel Body Valves with Monel Metal Mountings, Intended for Use on Lines 16 and 20 In. in Diameter and Operated Either by Hand or by Gears

The valve handwheels have cork grips to furnish insulation against heat when operating under plant conditions and the specifications under which they were made provide for an extra long condensing chamber with a view to protecting the packing against excessive heat and a swing-bolted stuffing box to enable the stem to be packed when the valve is open and under pressure. The valves are guaranteed to operate under a temperature up to 800 deg. F and a working pressure up to 400 lb. Before the valves were shipped they were subjected to a hydraulic test at a pressure of 1000 lb. and were also put through a steam baking process with a view to guarding against leaks due to expansion.

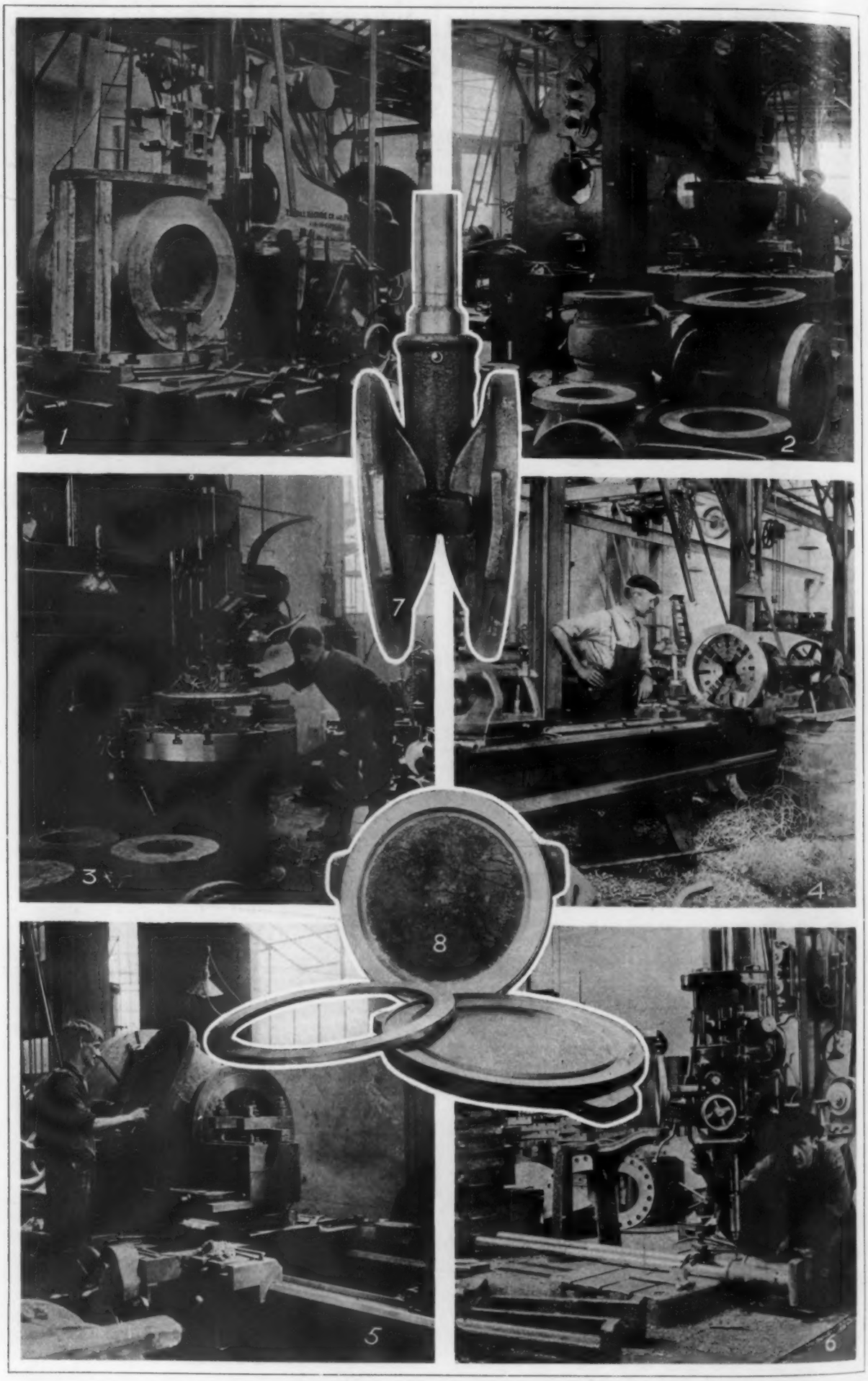
In the large halftone plate the various machining operations in the manufacture of the 20-in. valves are shown, the procedure being practically the same for the other sizes. The first test was the facing of the flange and the finishing of the diameter of the body. This was done in a 72-in. boring mill, one head being used for facing the flange while the diameter was finished with the other. No compound was used in the boring or turning operations except when the finishing cut on the flanges was being taken and high-speed steel was used. After the flanges of the body and of the bonnet end have been faced, the casting is taken from the boring mill to a special seating lathe, No. 5, where the seats of the body are turned out and tapped. The Monel metal seat ring is assembled and turned to the angle gauge provided for the seats, the valve being reversed to enable the second seat to be machined.

From the seating lathe the body is taken to the special shaping machine, No. 1, where the guides are machined with a view to securing dependable operation of the internal parts of the valve. From the shaping machine the valve body goes to a multiple drilling machine where the bonnet and main flanges are drilled with jigs, the holes on the back of the flanges being spot faced to give accurate seating of the flange bolts and nuts. From this machine the body goes to the assembly department to await the completion of the other parts.

The machining operations on the valve bonnet are the same except that it does not go to the seating lathe, being handled entirely by the boring machine, No. 2, the shaping machine and the multiple and radial drilling machines, the last being used for drilling the yoke stud holes. The guides in the bonnet are machined to correspond with those in the body to secure proper alignment of the guides and insure smooth passage for the lugs on the valve disks.

After the body and the bonnet arrive in the assembly department, a strong alkaline solution is employed to swab them out and remove the chips and dirt that may have collected during the machining. In this way all likelihood of dirt getting between the seat and the disk before the valve is closed for the first time is eliminated.

The disks have to withstand the wear and tear of actual operating conditions and for that reason are probably the most important parts of any valve structure. These particular valves are of the double-disk type which it is emphasized gives a flexible construction for the severe conditions met with in superheated steam practice. The assembly of the stem, wedge and disks is shown in No. 7, while No. 8 shows a 20-in. valve disk lying on its flat after being machined to receive the Monel metal disk ring which is lying upon it. A completed disk standing on edge in the background shows how the ring has been secured in place by peening over the steel lip on the inner diameter of the ring. After peening the disk is mounted in the boring mill No. 3 and the face machined, a finishing touch being taken across the peen marks, on the inside of the ring also. Prior to the placing of the Monel metal disk ring in the steel disk it is machined in an ordinary



VARIOUS STAGES IN MACHINING LARGE STEEL BODY SUPERHEATED STEAM VALVES WITH MONEL METAL MOUNTINGS

engine lathe, as shown in No. 4. In securing the Monel metal stem to the cast steel wedge, the end of the former is threaded and screwed into the wedge. A hole is then drilled through both the wedge and the stem as shown in No. 6. This is afterward reamed to take a taper pin which is driven home and riveted on both ends, one end of the pin being shown in No. 7. This arrangement, it is emphasized, fastens the stem and the wedge together permanently. The steel yoke for the yoke cap is finished in a horizontal milling machine.

After the parts have been machined they are cleaned and assembled and the valve subjected to the hydraulic and steam baking tests previously mentioned to guard against leaks that might develop as a result of the warping action of the steam. The pressure is applied between the disks and serves as an additional test of the body and bonnet castings.

The patterns used for making the molds were of no special design with the exception of the use of an elliptical section with enlarged filets and the making of provision for flange adjustment along the center line of the valve for meeting different face to face dimensions.

VANADIUM IN GERMAN ORES

Its Behavior in the Blast Furnace—But Little Found in the Steel

The presence of vanadium in certain iron ores of Germany, and details regarding its behavior during the ordinary metallurgical operations, are mentioned in an interesting paper by L. Blum, in a recent issue of Stahl und Eisen. He is chief chemist at the large new plant at Esch, and his attention was directed to the matter because of the difficulty experienced in correctly estimating the iron in basic Bessemer slags, a difficulty caused by the presence of vanadium. The ordinary Reinhardt process on six of these slags gave an average of 10.46 per cent. iron. Careful gravimetric results, carried out so as to separate the vanadium, only gave 9.54 per cent. iron. Mr. Blum then recommends methods of analysis. In very brief outline they are that in one sample the iron and vanadium be titrated together with potassium permanganate, and in another the vanadium alone. The difference gives the permanganate used on the iron, from which the percentage can be calculated. Results obtained in this way gave 9.51 per cent, iron, agreeing well with the 9.54 per cent. obtained by gravimetric determination.

These results caused Mr. Blum to investigate the metallurgical side of the question. No vanadium could be found in the ash of the coke used in the blast furnace, in the Poti ore used as a flux with the Minette ore, nor in the lime used as a flux in the Bessemer process. The vanadium found in the Bessemer slags can only come, therefore, from the Minette ore. Analyses of eleven ores are given in the following table:

Analyses of Minette Ores

No.	Mine	Iron, per cent.	Vanadium, per cent.	Corresponding vanadic acid, per cent.
1.	Bouvenberg von Redingen..	37.49	0.102	0.182
2.	Vereinigte Huttenwerke von Belvaux	36.75	0.102	0.182
3.	Victor at Hayingen.....	29.64	0.071	0.126
4.	Lallingerberg at Eich.....	25.63	0.095	0.169
5.	Yellow Minette, Langengrund at Rumelingen....	31.86	0.102	0.182
6.	Brommeschberg at Tetingen	29.41	0.088	0.156
7.	Esch Hoehl, red sflicious layer	29.00	0.092	0.163
8.	Esch Hoehl, red lime layer. layer	27.44	0.075	0.133
9.	Esch Hoehl, grey layer....	27.44	0.075	0.133
10.	Esch Hoehl, brown layer...	30.52	0.068	0.121
11.	Esch Hoehl, black layer...	42.23	0.095	0.169
		41.34	0.109	0.194

The five last analyses, Nos. 7 to 11, give ores from one mine arranged according to their geological age, the youngest being given first and the oldest last. There is no great difference in the vanadium contents.

The first product of this ore, basic Bessemer iron with about 0.4 per cent. silicon, 1.2 per cent. managanese, 1.8 per cent. phosphorus, and 0.06 per cent. sulphur, shows that the vanadium partly enters the iron and is partly slagged off. The iron from four different casts gave:

Test 1.....	0.203 per cent. vanadium
Test 2.....	0.203 per cent. vanadium
Test 3.....	0.155 per cent. vanadium
Test 4.....	0.163 per cent. vanadium
Average.....	0.181 per cent. vanadium

The blast furnace slag gave:

Test 1.....	0.139 per cent. vanadium
Test 2.....	0.144 per cent. vanadium
Test 3.....	0.105 per cent. vanadium
Test 4.....	0.107 per cent. vanadium
Test 5.....	0.109 per cent. vanadium
Test 6.....	0.120 per cent. vanadium
Average.....	0.121 per cent. vanadium

The vanadium in the ore behaves like manganese in the blast furnace, in that according as the furnace works hotter or colder, a more or less large part of the vanadic acid is reduced or slagged off.

The vanadium in the iron is easily oxidized and slagged. On the way from the furnace to the pig-iron mixer the small amount of slag that is formed shows 1.19 per cent. vanadium, corresponding to 2.11 per cent. vanadic acid. The mixer slag also shows that more has been oxidized. An average of two samples gave 0.370 per cent. vanadium. Another test, which was an average sample of a week's production, gave 0.50 per cent. vanadium, corresponding to 0.908 per cent. vanadic acid. After these losses the iron to be blown gives the following results:

Test 1.....	0.149 per cent. vanadium
Test 2.....	0.176 per cent. vanadium
Test 3.....	0.149 per cent. vanadium
Average.....	0.158 per cent. vanadium

This is practically all oxidized during blowing in the converter, being found in the basic Bessemer slag as vanadic acid. The steel from two heats showed 0.013 and 0.007 per cent. vanadium, an average of only 0.01 per cent. The average of six different days' slag analyses gave 0.87 per cent. vanadium, equal to 1.59 per cent. vanadic acid; and another average of four days' analyses gave 0.70 per cent. vanadium, equal to 1.24 vanadic acid.

G. B. W.

How Portable Electric Tools Save Labor

The use of portable electric tools is rapidly increasing. At first these were tools only employed for drilling and grinding metal, but lately building contractors and wood-working plants have found them almost indispensable for different kinds of work. William Miller & Son, a contracting firm in Cincinnati, Ohio, recently handled a rush job that could not have been completed on time without the use of a portable electric screw driver. The contract in question called for the finishing of 54 12-ft. single benches for a ball park. A total of 50 gross No. 11 1½-in. screws was used on this job, and the contractor's record shows that the total labor included 25½ hr. carpenter's time and 29 hr. apprentice's time. The saving of time and labor effected is estimated at over 75 per cent. as compared with hand labor. The electric screw driver used was made by the United States Electrical Tool Company, Cincinnati, Ohio.

Cling-surface, the material used for improving belting and belt operation, is now obtainable in semi-fluid form, so no preliminary heating is necessary, unless it has been kept exposed to winter temperatures when it is sufficient to heat it to 100 deg. F., or hand warm, for a few minutes or long enough to soften it.

Preventing Losses in Factory Power Plants*

Savings Effected in Power Transmission by Shafting and in Boiler and Engine Rooms—The Supervising Engineer as an Industrial Plant Necessity

BY S. J. H. WHITE

The following tests for friction losses of line shafting, counter-shafts, belts, etc., were made by the writer recently in a manufacturing plant, and as they show more or less excellent conditions may serve as a guide to others for the purpose of comparing their losses. In many plants there is no doubt the losses referred to are enormous, and tests should be conducted to ascertain the conditions and remove undue losses.

To avoid the necessity of giving details of machinery driven, as to size, etc., it may be stated that the product of this factory is a little machine weighing less than 10 lb. completed; this clearly indicates that all machinery is comparatively small, and the parts manufactured are all small and light. The shop equipment consists of screw machines, millers, profilers, drill presses, punch presses, tappers, lathes, grinders, polishing and buffing stands, gear cutters, baking and drying ovens, plating apparatus, etc. All shafting is supported in ball and socket, two point adjustment, double arm, ring oiling, 24-inch drop hangers, spaced on 10-ft. centers. Shafting is of best grade turned and polished steel.

Tests were made with a three phase 60-cycle 220-volt self-contained regular service type of recording watt-hour meter and were conducted for periods of 1 to 5 h., depending on the size of the motors. All motor belts, belts from the line shafts to sub-shafts, belts from line shafts to countershafts, belts from line shafts to punch press flywheels, and to polishing and buffing stands, grinders, drill presses, etc., and loose pulleys were left running during tests. Also the exhaust fan of the dust collection system in the polishing department was left running, as the writer prefers to consider the fan load as a loss to an extent.

The following clearly indicates the use of group driving, and while it is frankly admitted there are far more feet of line shafting per motor in several departments than is considered good engineering, it is due entirely to the refusal of the management of the plant to purchase the necessary new motors to lay out the plant along ideal engineering lines. However, as the company owned a sufficient number of large motors in excellent condition, it was only natural to prefer to use what was available rather than purchase new motors to save the possible few per cent. in cost of operation, which saving probably would not equal the interest on the investment in new motors.

In considering the following data, it should be remembered that in each case the "friction per bearing" items also include the various belt losses, and hence are not strictly speaking friction per bearing losses. The tests were conducted for the purpose of locating undue losses, or for commercial reasons only, and the tests and data are not to be considered as scientific. As operating engineers are essential to secure results, it is immaterial whether they secure results by elaborate and expensive tests, or by simple inexpensive tests, to detect and remove preventable losses, though usually the simple tests result in the most good.

Punch Press Department:

South shaft, 160 ft. of 2 11/16 in. diam., 16 hangers, speed 150 r.p.m.
North shaft, 120 ft. of 2 3/16 in. diam., 12 hangers, speed 150 r.p.m.
Motor belts to south shaft, which is belted back to north shaft.

Total number of bearings in operation	32
Total hp. consumed in friction	3.42
Friction per bearing, including belt losses, hp.	0.107
Friction per machine, including all losses, hp.	0.171
Number of machines driven	20

Screw Machine Department:

South shaft, 150 ft. of 2 11/16 in. diam., 15 hangers, speed 200 r.p.m.
North shaft, 170 ft. of 2 11/16 in. diam., 17 hangers, speed 200 r.p.m.
Motor belts to south shaft, which is belted back to north shaft.

Total number of bearings in operation	90
Total hp. consumed in friction	6.83
Friction per bearing, including belt losses, hp.	0.076
Friction per machine, including all losses, hp.	0.235
Number of machines driven	29

Drilling and Tapping Department:

South shaft, 80 ft. of 2 3/16 in. diam., 8 hangers, speed 200 r.p.m.
North shaft, 70 ft. of 2 3/16 in. diam., 7 hangers, speed 200 r.p.m.
Motor belts to north shaft, which is belted back to south shaft.

Total number of bearings in operation	49
Total hp. consumed in friction	2.28
Friction per bearing, including belt losses, hp.	0.046
Friction per machine, including all losses, hp.	0.134
Number of machines driven	17

Milling and Profiling Department:

North line shaft and motor.
Line shafting, 100 ft. of 2 7/16 in. diam., 10 hangers, speed 200 r.p.m.
Motor belts direct to this shaft.

Total number of bearings in operation	30
Total hp. consumed in friction	2.28
Friction per bearing, including belt losses, hp.	0.076
Friction per machine, including all losses, hp.	0.228
Number of machines driven	10

South line shaft and motor.
Line shafting, 100 ft. of 2 7/16 in. diam., 10 hangers, speed 200 r.p.m.
Motor belts direct to this shaft.

Total number of bearings in operation	32
Total hp. consumed in friction	3.42
Friction per bearing, including belt losses, hp.	0.107
Friction per machine, including all losses hp.	0.311
Number of machines driven	11

Rough Stores Department:

Line shafting, 20 ft. of 2 3/16 in. diam., 3 hangers, speed 150 r.p.m.
Motor belts direct to this shaft.

Total number of bearings in operation	5
Total hp. consumed in friction	1.17
Friction per bearing, including belt losses, hp.	0.234
Friction per machine, including all losses, hp.	0.39
Number of machines driven	3

Tool Room Department:

West line shaft motor.
One line shaft, 90 ft. of 2 7/16 in. diam., 9 hangers, speed 200 r.p.m.
One sub-shaft, 20 ft. of 2 3/16 in. diam., 3 hangers, speed 200 r.p.m.
Motor belts to main shaft, which is belted back to sub-shaft.

Total number of bearings in operation	46
Total hp. consumed in friction	3.42
Friction per bearing, including belt losses, hp.	0.075
Friction per machine, including all losses, hp.	0.201
Number of machines driven	17

East line shaft and motor.
Line shafting, 90 ft. of 2 7/16 in. diam., 9 hangers, speed 200 r.p.m.
Motor belts direct to this shaft.

Total number of bearings in operation	39
Total hp. consumed in friction	1.14
Friction per bearing, including belt losses, hp.	0.029
Friction per machine, including all losses, hp.	0.076
Number of machines driven	15

Initial Assembly Department:

Line shafting, 70 ft. of 2 3/16 in. diam., 8 hangers, speed 200 r.p.m.
Motor belts direct to this shaft.

Total number of bearings in operation	32
Total hp. consumed in friction	1.51
Friction per bearing, including belt losses, hp.	0.063
Friction per machine, including all losses, hp.	0.125
Number of machines driven	12

*Concluded from page 779, *The Iron Age*, April 8.

Polishing and Buffing Department:

Line shafting, 60 ft. of 2 7/16 in. diam., 7 hangers, speed 300 r.p.m.
Motor belts direct to this shaft.
NOTE—One 30-in. exhaust fan was running under full load in this test, hence losses given below include the fan load loss.

Total number of bearings in operation	19
Total load, hp	10.25
Horsepower per machine	1.14
Number of machines driven	9

The nickel plating and experimental departments each have 20 ft. of 2 3-16-in. shafting driven by separate motors, but these were not tested as the motors are too small to make the test of value with the instruments available.

The above tests indicate that the belting back from main shaft to a sub-shaft increases the friction loss, and it is better practice to install a separate motor for each sub-shaft; this has been done in the punch press department, with better results, since the test was made; the writer has recommended similar changes in other departments.

It is also apparent that the number of bearings in operation has not such an effect on the friction losses as one would naturally expect; for instance, in the screw machine department, with a total of 90 bearings in operation during the test, and the largest number of belts per machine in the plant, the loss per bearing was 0.076 hp., while in the milling and profiling department, with only 30 bearings in operation on the north line shaft, nearly the same belting per machine, and machines requiring about the same horsepower to drive under load, the loss per bearing was exactly the same. Again the heaviest loss per bearing was in the rough stores department, with only 5 bearings, the loss being 0.234 hp. per bearing.

Another conclusion from the tests is that the speed of the shafting has but little effect on the friction losses in this plant.

In conclusion I would add that selecting the oil for lubrication of line shaft hanger bearings, counter-shaft bearings, etc., is a very important though usually neglected matter. Sometimes, and in fact very often the price per gallon is the only consideration given this subject. This is very poor economy. After several fair and very thorough tests the writer recommended the use exclusively for this purpose of a liquid grease; the cost per gallon is perhaps the highest of any lubricant for the purpose on the market. This grease is used in all hanger bearings, counter-shaft bearings, loose pulleys, polishing stands bearings and loose pulleys, and has been for over two years; the annual cost of lubricating above bearings has been less with this grease than with any other form or make of lubricant used or tested. The fact there has not been a single case of hot bearing in the plant since adopting this grease is conclusive evidence that it is doing its work well; further the above tests would indicate that it is a very successful friction reducer. This grease is used in the regular type of ring oiling bearings, and requires no special cups or other devices for feeding; it also works successfully in several wick oiling bearings in this plant.

The writer does not claim for any of the above-mentioned tests any unusual accuracy, or especially scientific methods; as commercial operating engineers all that is expected of us is results. The tests were made largely for the purpose of comparisons whereby unusual losses would be clearly indicated, hence if the same methods were used in conducting all tests, errors of methods or of instruments would not materially affect the results secured and desired.

Practical commercial engineering is what most plants require; theoretical engineering is of great value as a foundation upon which to build successful practical engineering, but in itself it will not and cannot secure the desired results. After all, what is successful engineering but the simple application of good common sense arising from a whole lot of good hard thinking along the lines of cause and effect?

Small Production of Merchant Ships

WASHINGTON, D. C., April 13, 1915.—The output of merchant ships by American shipyards for the nine months ended March 31, 1915, is the smallest recorded in 17 years, according to official figures compiled by the Bureau of Navigation of the Department of Commerce. The total construction was 714 vessels of 153,326 gross tons, compared with 881 vessels of 215,059 gross tons for the same period in the fiscal year 1913-14. The unsatisfactory record of the first nine months of the current year is credited by officials here to the general depression existing prior to July 1 last and is not due to any material extent to the effect of the European war nor the practical operation of the ship transfer act of August 18, 1914, which has brought nearly half a million tons of American-owned foreign vessels under the United States flag.

Of the metal construction (54 vessels of 89,993 tons) reported in the fiscal year 1915, 29 vessels, with an aggregate of 72,640 tons, were built on the Atlantic and Gulf coasts; 5 vessels, aggregating 14,238 tons, on the Pacific coast; 17 vessels, aggregating 2783 tons, on the Great Lakes, and 3 vessels, aggregating 332 tons, on the Western rivers. Of the steel vessels built all but four small boats were propelled by steam; one was equipped with sails and three were unrigged barges.

In support of the contention that the decline in merchant-ship construction here noted is due neither to the war nor to the ship transfer act, the officials here point to the fact that practically all the vessels thus far numbered were contracted for prior to July 1 last and before there was any reasonable prospect that war would be declared or that Congress would pass a ship transfer act. The Bureau of Navigation is advised that the closing quarter of the year will show a substantial proportionate gain over the first nine months, although the total for the fiscal year will probably fall below that of any year since 1898. A large number of contracts for merchant vessels have been placed in the past six months which will not be completed until after July 1 next, but the work is well along and the leading yards are more fully occupied than would appear from the production figures above presented.

Included in the construction now under way are 8 steel vessels, the keels of which have been laid by the Newport News Shipbuilding & Drydock Company, and 6 by the Maryland Steel Company, the 14 vessels aggregating about 70,000 tons. On the basis of contracts already let, the fiscal year 1916 will record a substantial increase over the current fiscal year, but the extent of the improvement will depend largely on the practical effect of the so-called merchant marine seamen's act of March 4, 1915, which will unquestionably cause a material increase in the cost of constructing and operating merchant vessels in both the foreign and coastwise trade.

Up to April 1 the additions to the American merchant marine, as the result of transfers made under the act of August 18, 1914, have numbered 125 vessels, aggregating 485,587 tons, valued at $31,107,270. Of these vessels, 103, aggregating 444,263 tons, are steamers, averaging 4310 tons each and having a total value of $30,265,000. The remaining 32 vessels, of 41,324 tons, are sail rigged, averaging 1300 tons each and having a total value of $841,971. The values here given are the book values furnished by the owners and are conservative, including, as they do, heavy depreciation charges. It is estimated that there still remain available for transfer to the American flag about 250,000 tons, but there are likely to be few additional changes of register until the effect of the new seamen's law has been demonstrated. W. L. C.

SPELTER PRODUCTION IN 1914

Statistical Position Favors Producers—Capacity May Be Taxed

C. E. Siebenthal, United States Geological Survey, has just issued his report on the production of spelter in the United States in 1914. He gives the total production of primary spelter (made from ore) as 353,049 net tons, against 346,676 tons in 1913, an increase of 6373 tons or 1.8 per cent. The consumption of primary spelter he figures as 299,130 net tons, against 295,370 tons in 1913, an increase of 3760 tons, or 1.2 per cent.

The total production from domestic ores in the year was 343,418 tons, against 337,252 tons in 1913. Only 5093 tons was produced from Mexican ore, as compared with 6205 tons in 1913 and 10,700 tons in 1912. For five years the smelting of Mexican ore has shown a decline. The production, in this country, from Canadian ore amounted to 4538 tons, against 1424 tons in 1913 and 4199 tons in 1912. The smelting of Canadian ore in the United States has shown a tendency to increase for several years. Of the entire quantity of primary spelter produced in the United States in 1914, Illinois led with 127,946 tons, Oklahoma next with 91,367 tons and Kansas third with 44,510 tons.

WORLD'S PRODUCTION IN 1913

The report gives the world's production in 1913 as 1,093,635 tons against 1,070,045 tons in 1912. Belgium smelted 217,928 tons in 1913 and Germany 312,075 tons, these two countries being the principal European producers. In both 1912 and 1913 the United States smelted 31.7 per cent. of the entire production.

The amount of secondary spelter produced in this country in 1914 from redistillation, remelting or recovered from alloys, excluding brass remelted, is estimated at 46,415 tons, against 53.748 tons in 1913.

How exports of domestic spelter and of zinc sheets were stimulated by the European war is shown in the following table:

1914	Pounds	1914	Pounds
January	459,703	September	38,090,144
February	35,550	October	20,517,926
March	292,094	November	25,493,697
April	120,149	December	36,642,727
May	214,201		
June	425,210	1915	
July	313,166	January	30,597,854
August	6,896,504	February	29,203,018

Stocks of spelter at smelters were as follows at the close of the each of the past five years:

	Net tons		Net tons
1910	23,201	1913	40,659
1911	9,049	1914	19,984
1912	4,474		

Statistical Position of the Metal

Mr. Siebenthal makes the report more interesting by an analysis of the statistical position of spelter, which goes into the probabilities of the immediate future as well as into the conditions of the past year. It is in part as follows:

The production of primary spelter made a substantial gain in 1914, and this, taken in conjunction with the large stocks, made available a far greater supply of primary spelter than ever before. Although the production of secondary spelter fell off markedly, nevertheless the total spelter available for consumption was the greatest in the history of the industry. Only the enormous exports of spelter for use in the war prevented a great increase in stocks. As it was, stocks were greatly reduced from the quantities in hand at the first of the year.

The relatively small stocks at the close of 1914, in the face of the very large quantity of spelter available for consumption, might suggest that there were large "concealed" stocks of spelter in the hands of consumers and brokers. In 1912 the quantity of spelter available for consumption was very great, yet at the close of the year there were smaller stocks than for many years. Later events showed that on the strength of the rising market during the year large stocks had been laid in by consumers and others, which are not taken into account in the statistics. In 1913 there was again a large quantity available for consumption, but owing to declining prices of spelter the concealed stocks in consumers' hands satisfied the demands of the market, and at the smelters the large stocks accumulated which are shown in the statistics for that year. It will be observed, however, that large concealed stocks must necessarily be accompanied by an abnormally large apparent consumption. The apparent consumption for 1914 is not abnormally large.

TRADE REPORTS APPEAR TOO PESSIMISTIC

However, if it could be shown that the spelter consuming industries were at a low ebb and probably absorbed only a small fraction of their normal consumption, then it would appear probable that the apparent consumption given below, though not over large, might represent a considerable quantity which had been withdrawn from the market for speculative purposes. It has been claimed that the brass industry ran on a 60 per cent. basis during the latter part of 1914, and at the same time the iron and steel industry (including galvanized products) was on a 50 per cent. basis. These figures seem too pessimistic. Responses from a limited number of representative and important interests indicate that the consumption of spelter in galvanizing in 1914 was about 90 per cent. what it was in 1913, and that the consumption of spelter in brass making was about 88 per cent. that of 1913. These two industries probably account for about 80 per cent. of the spelter consumption of the United States. If the considerable decrease in the quantity of secondary spelter recovered in 1914 be borne in mind, it does not seem probable that there can be any large quantity of concealed spelter stocks in existence. A consideration of the total apparent consumption of spelter for a period of years leads to the same conclusion.

To estimate the total apparent consumption of spelter in the United States, the production of secondary spelter, both redistilled and remelted, should be taken into account. The stocks of secondary spelter are not available, so that consumption of secondary spelter must be assumed to be the same as the production, which must be very nearly the fact, for the reason that secondary smelting interests are generally small. The annual figures of apparent consumption of primary spelter and of the production of secondary spelter are given below for six years.

Consumption of Spelter, 1909-1914

Net tons	Apparent consumption of primary spelter	Production of secondary spelter	Approximate total spelter consumption	Estimated normal total consumption of spelter
1909	270,730	33,040	303,770	285,000
1910	245,884	41,223	287,107	304,000
1911	280,059	40,513	320,572	322,500
1912	340,341	52,251	392,592	341,000
1913	295,370	50,015	345,385	360,000
1914	299,130	42,615	341,745	378,500
Total			1,990,876	1,991,000

The average yearly approximate consumption for this period is 331,813 tons. The consumption for 1912-1914 is about 84,000 tons in excess of the average for the whole period, and the consumption for 1909-1911 is about 84,000 tons less than the average. From these facts we may readily determine the normal annual increase and can then estimate the normal consumption of spelter, both primary and secondary, as given in the last column of the table above. The normal or prospective consumption of spelter for 1914 is seen to be 37,000 tons greater than the indicated actual consumption, from which it is to be inferred that large concealed stocks of spelter at the close of 1914 are not probable.

ESTIMATE AS TO POSSIBLE DEMAND

If spelter-consuming industries in the United States enjoy prosperous conditions in 1915, so that the total spelter consumption makes its normal gain (which, however, in view of the high price of spelter and the resulting effect on domestic consumption, is scarcely probable), figured on the totals for the last six years, as shown in the last column of the table above, the total

domestic spelter consumption for 1915 would approximate 397,000 tons. If to this we add a year's domestic exports at the rate shown since the beginning of the war in Europe, 180,000 tons, and a year's foreign exports at the rate during the latter half of 1914, equal to 17,000 tons, we get 594,000 tons as the possible demand for spelter. This, however, is not the maximum possible quantity to be demanded. Attention was directed by the United States Geological Survey in a press bulletin, in August, 1914, to the opportunity for the American zinc industry to supply the major part of 222,000 tons of export spelter a year as long as the war lasts. As pointed out above, exports of spelter for seven months have been made at the rate of 197,000 tons yearly. Moreover, there remains the possibility of the trade in galvanized sheets, wire, and products with the southern continents and Asia. So far this has not been touched. The exports of galvanized sheets in 1914 were 45,318 net tons, compared with 86,475 tons in 1913. The exports of barb wire, plain and galvanized, were 105,078 tons, as compared with 107,586 tons in 1912. When the United States comes into its share of the trade in galvanized products with the southern continents and Asia, the domestic consumption of spelter will be increased and will in turn increase the total possible demand for zinc given as 594,000 tons above.

MAY NEED MAXIMUM PRODUCTION

On consideration, the domestic smelting capacity seems scarcely more than equal to this possible demand. The total number of ordinary retorts completed and contemplated at the close of 1914 is 124,016. Some of those contemplated can not be completed before the latter part of the present year. If we estimate the average capacity per retort as 4¼ tons of spelter per year, the capacity of 124,016 ordinary retorts together with the large retorts listed is approximately 535,000 tons. Add to this 20,000 tons of stocks on hand and 30,000 tons of remelted spelter, we get 585,000 tons. If we take into account that the maximum smelter capacity indicated above can not be reached until the latter part of the year, and consider the possibility of increased demand for galvanized products, it seems very improbable that there will be any surplus smelter capacity or accumulation of spelter stocks during the year. Apparently a continued decline in prices can come about only by a slackening in the foreign demand for spelter for war purposes.

If the United States is called upon in 1915 for the possible supply of 594,000 or even 600,000 tons of spelter, the zinc will be probably at hand without increasing the mine production above the normal, to furnish nearly 560,000 tons of it. The remainder would easily be supplied by increased production from Montana, Idaho, Colorado, New Jersey, Tennessee, and other States, under the stimulus of high prices. In the Joplin district alone much lean sheet-ground territory not recently operated would become productive under continued high prices, to say nothing of increased production from operating and new mines.

Zinc ore was imported from Mexico at the rate of less than 200 tons of zinc content per month for the first eight months of 1914. Conditions limiting the shipment of zinc ore from that country have recently eased up somewhat and the imports for the period September, 1914, to and including February, 1915, have averaged 1600 tons of zinc content, so that a larger supply than for the last two years is to be expected from that country. The available supply from Canada will no doubt be largely increased by the high prices.

In conclusion, it appears that spelter is in a highly advantageous position as far as the statistics afford evidence, and the only danger to be apprehended is that the prevalence of high prices may so limit the domestic consumption as to partly offset advantage gained from the increased foreign demand. The high price of galvanized sheets, for instance, has led some rolling-mill operators to advise their customers to substitute heavier black sheets coated with paint. It further appears that the zinc resources of the United States are amply able to satisfy any possible demand that is likely to be made upon them in the immediate future, without drawing upon the zinc tailing piles of Australia.

Book Review

Preventing Losses in Factory Power Plants. By David Moffat Myers. Pages, 560; 7½ x 5⅛ in.; illustrations, 68. Published by the Engineering Magazine Company, New York. Price, $3.

The book starts with the efficiency standards as fixed by natural laws, the ideal in steam engineering presenting a definite goal. One cannot turn into power more energy than is contained in the fuel, nor can energy be destroyed or increased. In the same way as the accountant takes up the expenditure of $100, so the steam engineer can follow the expenditure of 14,000 B.t.u. of coal; and as their cost can be readily determined, so can the money losses be followed through the various stages in converting this coal into the desired power. The factory owner, if he keeps any track of coal costs at all, probably compares it to the output of product, a dangerous comparison, because so many items can affect it. He is not in a position to say whether he should buy the high price coal or the low price coal, and he simply gambles on it, but unfortunately never knows whether he wins or loses.

The plan is outlined for an ordinary factory power plant investigation where the start is made in the boiler house and the combined efficiency of the boiler and furnace first determined. The evaporation from the coal is determined and the cost of evaporating 1000 lb. of steam. This investigation shows the percentage of rating developed by the boilers and starts investigating as to whether this is the most economical mode of operation. The number of heat units in the coal is ascertained with the percentage of ash, moisture, etc., followed by the analysis of the waste gases, their temperature and amount of combustible matter in the ash. The ordinary and preventable wastes are shown and advantages of both high and low price fuel, including the burning of fuels other than coal. Following the steam into the steam piping come the common losses due to poor design or uncovered pipes as well as the items of safety. In the engine room the steam consumption per horsepower or per kilowatt-hour are compared to good normal consumption for that type of equipment. In this way the amount, location and causes of the preventable losses are found and recommendations can be made for their elimination.

Advantages of different types of equipment are shown and methods of effecting a possible saving by changes. Local conditions are taken into consideration, variation of loads during different seasons of the year, heating, condensing or non-condensing and the uses of exhaust steam. The true cost of power can thus be determined and enables the manager to know what he could afford to pay per kilowatt-hour if he cared to consider buying from a central station. When a large amount of steam is required for heating, many manufacturers make the mistake of buying their electric power when they could easily obtain most of this as a by-product of the heating system, a fact little realized outside of engineering circles.

The first nine chapters of the book cover these matters rather broadly, but in such shape as to be easily digested. Much emphasis is laid by the author on the human factor in the boiler house and engine room. The latter chapters go into the details of test data and conclusions on the combustion process and steam engine testing with suggestions on investigation reports. The book has been written expressly for managers and owners of factories. It contains little that an up-to-date steam engineer should not know, but has presented the matter in such form that makes it valuable for those who are interested in the economical operation of the factory power plant. There are few of such men including the engineers who can read this book without realizing some of the poor or uncertain economies in their own plant.

The Panama Canal, in its first six months of operation, handled 496 vessels carrying 2,367,244 tons as cargoes. Tolls amounted to $2,126,832, which, added to those collected on barges before August 15, make a grand total of $2,138,412. The average is now said to be $400,000 per month.

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EDITORS:
A. I. FINDLEY
GEO. W. COPE W. W. MACON
CHARLES S. BAUR, *Advertising Manager*

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Discounting Better Times?

Wall Street, or at least a part of it, has had in the past week a vision of prosperity. Spectacular advances have been made in particular stocks, including those of the Bethlehem Steel Company, the motor companies and some others whose capacity for furnishing war supplies is taxed to the limit. There have been also good gains in stocks of companies not so directly benefited by the war. Whatever reasons have been put forth to explain the sensational advances in a few stocks, there is agreement among the financial commentators, in the view that the "public" has set about discounting the advent of larger business in all lines. We have been told again that Wall Street looks ahead. Yet it is rather surprising to have that prescience attributed now to the "public," unless it be some other public than that which has always been credited with buying stocks when prices have nearly reached their hight on a grand movement.

Men in the iron and steel trades need not be told that there has been no recent increase in the demand for their products paralleling the late increase in values of listed stocks. They are not unwilling to believe, however, that the future holds larger business and better earnings for all companies engaged in iron and steel manufacture. They believe that the advance to better things will be gradual and they prefer to have it that way. They see political influences that do not conduce to prosperity nor to the free launching of new enterprises; but they are not unmindful of the vast benefits conferred upon business by the unique position this country occupies in this time of world unsettling and of widespread destruction of life and property. Nor do they overlook the effects of the economies the people of this country have been forced to practice; nor the help business will get from the new currency regime, even with its ultimate dangers of inflation; nor the gain to the world from peace in Europe which it is assumed a part of Wall Street is seeing before the rest of the country.

Simultaneously with the happenings in Wall Street we have had fresh proclamations of prosperity from Washington. Some of these official statements may be accurate in certain particulars, though in all of them deductions have been made from facts of slender proportions. The Comptroller of the Currency may be correct in saying that business throughout the country has been stabilized through the application of economy, but he is far from giving a true picture when he says, for example: "Further orders have been placed for cars and rails by the railroads and some large contracts have been made for structural iron for buildings in different portions of the country." No lines could have been selected with which the steel trade has to do, in which present conditions as well as the outlook are less encouraging than cars, rails and structural steel. Car orders were never so pitifully few, if we except the last quarter of 1914. In January, February and March less than 9000 cars were booked, whereas 31,000 were placed in the corresponding quarter of 1914, the leanest car year on record. Nor is it easy to understand why the Secretary of the Interior should make so random a statement as this:

> Many industries, of course, are benefited by the war. Many more will be benefited when its end comes. Even steel mills working overtime on war orders will find increased domestic demand, accumulating at present, because of orders unfilled now.

The machine shops of one steel company may be working overtime on war orders, but no steel mill is working overtime on that account, nor are any orders waiting to be filled at any steel plant because it is working overtime on war orders. The picture presented is of domestic orders temporarily pushed aside, on which steel works will be let loose whenever war demand ceases. Nothing is to be gained by such utterly misleading statements, nor by that of the Secretary of the Treasury that "in every section of the country there is now a pronounced business revival except in Maine and in a few isolated districts, and confidence and optimism prevail everywhere."

There is no question that the outlook in iron and steel for 1915 is better than at any time in the present year and that the estimates of the scale of operations this year, as made two or three months ago by leaders in the trade, are being conservatively revised upward. But it would be better for manufacturers and consumers of steel and for industry in every line, if truth were regarded and judgment were used in estimating the country's business prospects. The partisan boomers at Washington are no less culpable than the partisan pessimists who have painted the picture black for their own ends. As for the powerful appeal to the imagination made by the stock market exploits of the past week, it can only do harm if it should stimulate speculation such as in other times has brought reaction not only in security values but in industry.

Pig-Iron Production in 1915

The sharp increase in pig-iron production recorded in our blast-furnace report of a week ago may lead to some revision of views by those who doubted earlier in the year whether 1915 would show much if any larger production than 1914. The 1914 production, 23,332,244 gross tons, was 25 per cent. less than the record output of 1913, and was the smallest since 1905, barring only 1908 with its 15,936,018 toons.

The actual production in the first three months of this year, estimating the charcoal-iron output at the rate obtaining in the second half of last year, has been 5,400,000 tons, or at the rate of 21,600,000 tons annually, so that the industry would not be greatly handicapped in an effort to pass, this year, the make of 1914. The second quarter of the year opens with a daily rate, including four stacks blown in March 31 or April 1, of 70,591 tons, indicating a rate of pig-iron production, including charcoal iron, of 26,000,000 tons annually. Simply a continuance of this rate for the three remaining quarters would make the year's total 24,900,000 tons, or a gain of 1,600,000 tons over 1914.

Current steel market indications are that no further gain is to be expected in the rate of pig-iron production by the steel works; but in the long run their chances are greater for an increase than a decrease, seeing that they are still a trifle under the maximum rate of a year ago, when conditions certainly were not favorable. With the merchant furnaces the case is different. They have just begun to feel a quickening, while the steel works have been gaining steadily since December. The average daily rate of merchant pig-iron production in the four months of November to February inclusive lay within the extremely narrow limits of 15,306 and 15,661 tons, the difference being only the capacity of a single moderate sized furnace. The average rate in March, however, was 16,539 tons, and the present rate, by reason of the fact that several merchant furnaces blew in in March and several others have blown in since the close of the month, is probably not far from 18,000 tons. Thus, while the steel works cannot be counted upon with any degree of certainty to show increased pig-iron production in the near future, the merchant furnaces are clearly in the stage of increasing their operations. This occurs despite the fact that, eliminating the recent advance in Buffalo quotations which followed heavy sales, pig-iron prices are on an average measurably lower than they have been at any of the recent low points and are indeed lower than at any time since 1904, and are at a lower level than the average of any year since 1898. If in such circumstances merchant pig-iron production shows any tendency toward an increase, it has a future before it. Any price stiffening would doubtless lead to forward buying and replenishment of stocks by consumers, resulting in an increase in production.

Judged merely by the standards of to-day, and without attempting to forecast the future, the current year's production of pig iron should be about 25,000,000 tons. Passing to the realm of forecast, the chances now are in favor of the output being greater.

How large a production could be accomplished is not, as is sometimes supposed, chiefly a question of blast-furnace capacity. It is chiefly a question of prices of finished steel, castings, etc., on the one hand and of prices and supplies of blast-furnace raw material and labor supply and wage rates on the other hand. The market price of pig iron does not in itself dictate the quantity of pig iron the merchant furnaces will produce, the governing factor being the relation between pig-iron prices and the cost of labor and supplies. Thus in the general rise of 1912 it was computed with respect to many furnaces that the advances in coke and ore absorbed three-fourths of the advance in pig iron. Depending upon whether or not raw materials were covered before the pig iron was sold, the experience of an individual furnace would vary from this ratio. The physical capacity of existing blast furnaces is in excess of 35,000,000 tons a year, and in a strictly technical sense it is perhaps above 40,000,000 tons, but it is quite certain that before pig-iron production should reach a rate of 32,000,000 or 33,000,000 tons a year there would be spectacular advances—compared with the market experience of the past couple of years—in pig-iron and raw material prices.

A Check to "Dumping"

It is to be hoped that Secretary of the Interior Lane speaks by legal authority in regard to a check which may be used against the "dumping" of foreign manufactured products in this country. A dispatch from Washington states that Secretary Lane, in telling President Wilson of the efforts of the Interior Department to overcome the plight of dye importers and textile manufacturers, suggested that if German dyes should flood the United States after the close of the European war, to the detriment of American manufacturers, the new Federal Trade Commission would have power to protect them under the "unfair competition" clause of the law creating the commission. American textile manufacturers are threatened with the possibility of having to close their mills temporarily because of the cutting off of the supply of German dyes through the embargo on German commerce by Great Britain, and Secretary Lane has found American concerns disinclined to undertake the manufacture of dyes for fear that, with the end of the war, German makers would not only send large quantities of their products to the United States but sell them so cheaply that they would put American dye manufacturers out of business. Secretary Lane is quoted as saying that in his opinion this is easily guarded against, as he believes that the Trade Commission, under the clause forbidding unfair competition, has the power to prevent such dumping by foreign makers.

A careful reading of the law would appear to limit the clause on "unfair competition" to operation against domestic concerns, but, as the commission is empowered under another clause to inquire into competitive conditions abroad, it is possible that the act can be legally construed to enable cognizance to be taken of unfair competition from abroad with American manufacturers in our home market. Should this be the case, some com-

fort can be drawn by iron and steel manufacturers and others who fear that after the war European competition for business in this country will become keener than ever and that this country will become the dumping ground for a great variety of European products.

It is further comforting that this suggestion should come, not from persons directly interested in manufacturing or commerce, but from an officer of the National Administration responsible for the enactment of the Underwood tariff law of 1913, which so drastically reduced tariff duties. If Secretary Lane should find his attitude harmonizing with that of his associates in the Cabinet and with the leaders of his party in other branches of the Government, a great change will have been made in their viewpoint of American business interests. The Underwood tariff was enacted for the avowed purpose of cheapening manufactured products, whether domestic manufacturers were hurt or not. Possibly an object lesson has been given by the depression in our manufacturing industries of the past 18 months. It has been demonstrated that our manufacturers cannot lose a large part of their trade to foreign competitors without throwing great numbers of workmen out of employment. The cry of the unemployed is perhaps more penetrating than any wail of distress from manufacturers.

The Law Eliminating Freight Liability

WASHINGTON, D. C., April 13, 1915.—While the principal railroad systems of the country will probably secure a small average advance in rates as the result of the passage of the Cummins law, eliminating limited liability from bills of lading, there is no prospect that the roads will be permitted to take advantage of their technical right under the terms of the statute to advance their rates 10 per cent. as an offset to their increased liability. This is the consensus of the best opinion here, following a preliminary hearing before the Interstate Commerce Commission April 10, at which half a score of railroad attorneys and representatives of shippers' associations discussed the matter freely and gave their respective construction of the comprehensive amendment to the interstate commerce laws which was rushed through the recent Congress in its closing hours. The commission has notified all parties that briefs, giving their views in detail, will be received April 20, and that the commission will render a formal opinion before the new law goes into force June 3.

The interesting fact was developed at the hearing that the act affects commodities and is not limited to class freight as was generally believed when the act was passed. After consideration the members of the commission and representatives of the carriers expressed the opinion that, inasmuch as commodity rates are based upon limited liability, such rates must be regarded as within the scope of the statute which renders limitations upon liability unlawful. W. L. C.

Fewer Idle Cars

On April 1, according to the statistical department of the American Railway Association, the railroads of the United States reported 313,421 cars idle. On March 1 322,290 idle cars were reported. The decrease is not large, but it is the first which has been reported since last October. From November 1 to February 1 there was an interruption in the publication of these reports, but the tendency during that time was strongly toward an increase in the number of idle cars, as is shown by the fact that between those two dates there was a net increase of over 109,000.

DEFICIT, WAR TAX AND TARIFF

Shortage May Be $140,000,000—Tariff Revision and Higher Taxes Ahead

WASHINGTON, D. C., April 13, 1915.—The formulation of a new and comprehensive fiscal policy by the administration in the near future is foreshadowed by recent developments. The tariff and internal revenue are both involved in the problem, including the revision of the war revenue act, the reconstruction of the income tax law, and, in all probability, the floating of a bond issue. Business men of all classes will be affected and should follow developments with close attention.

The immediate cause of the interest recently aroused in this subject among administration officials and Congressional leaders is the completion of certain long-deferred statistics of internal revenue, which furnish the first reliable data concerning collections under the emergency war-revenue act and show the extent to which the revenues derived from the sale of distilled spirits have been invaded by prohibition. These figures are deeply significant.

PROHIBITION CUTS DOWN INTERNAL REVENUE

Treasury statisticians have been not a little puzzled at the course of the internal revenue receipts since the emergency war-revenue act took effect. On the basis of estimated receipts of $7,500,000 per month and with the normal gains from year to year which have been recorded in the past, the internal revenue to April 1 of the present year should have exceeded last year's figures by not less than $50,000,000. As a matter of fact, the excess is only a little over $9,000,000. The detailed statistics just completed by the internal revenue experts furnish the key to this puzzle. These figures show separately the receipts under the war-revenue act for November, December and January of the current fiscal year and demonstrate that the estimates were fairly accurate, the aggregate from this source being $21,452,752. The statistics also show, however, the course of the revenue from distilled spirits which, instead of making a gain over last year, declined for the first seven months of the current fiscal year approximately $11,000,000. Examining the record by months since July 1 last, it is evident that the decline has been progressive and the most experienced public men here accept it as practically certain that the enormous sum produced in past years from the sale of distilled spirits will rapidly shrink until, compared with customs collections, it will be a minor item on the credit side of the treasury ledgers.

ESTIMATED DEFICIT IS $140,000,000

The customs revenues to date show a loss of nearly $70,000,000, as compared with last year's receipts and as expenditures are nearly $28,000,000 ahead of last year, a total deficit is now recorded of $117,716,632. Adding to this an estimated postal deficit of more than $20,000,000 it appears that the Government is now facing a shortage of approximately $140,000,000. The net cash balance, which on January 1 was $66,770,000, has dwindled to $28,474,500, a loss of nearly $40,000,000 in three months.

To meet this situation without calling an extra session of Congress is the administration's first problem; to devise a new fiscal policy to take care of the future is a much more serious matter. The present deficit will probably be reduced somewhat by corporation and income tax payments before the end of the fiscal year, but very little of this money can be counted on before the latter part of June. If the cash balance continues to shrink at the rate recorded since January 1, the treasury will be swept bare by June 1, and in anticipation of this condition the department is curtailing disbursing officers' balances wherever possible and husbanding the cash reserve by every practicable device. An issue of short-time treasury certificates, however, appears to be the only way to meet the situation, for the officials recognize the fact that the corporation and income tax receipts which will come in at the end of the fiscal year must be promptly checked out

again to cover appropriations made by the recent Congress, which become available on July 1 next.

TARIFF REVISION AHEAD WITH SUGAR DUTY

Bond issues cannot go on forever and the short-time certificates with which it is proposed to bridge the prospective gap must be retired within a year; hence the Congressional leaders are now giving serious consideration to the features of a new fiscal policy, a part of which, at least, must be reduced to legislative form at the coming session. The details under consideration include the enactment of a genuine revenue tariff, including the restoration of the duty on sugar, the extension and amendment of the war revenue emergency act and the amendment of the income tax law by lowering the exemption to $2000 and possibly to $1000. A radical revision of the tariff law on the eve of the elections is not to be thought of, but there is no sound reason why the provision placing sugar on the free list May 1, 1916, should not be repealed next December, or at an extra session, and many influential Democrats are strongly advocating such a measure as a return to the time-honored principles of the party which for so many years contended for a sugar duty on a revenue basis only. The abandonment of this ancient principle has not helped the party, but will cost the treasury not less than $60,000,000 per annum.

It is estimated that the reduction of the income-tax exemption to $2000 would produce $50,000,000 and certain influential members of the House are confident that this amendment could be passed next winter. The more experienced political leaders fear the effect of such a measure in the next elections, contending that the reduction in the exemption, even if the rate of tax were also reduced, would place a burden upon many thousand voters who might visit their resentment upon the party in power at the polls.

WAR TAXES TO CONTINUE

In extending the war revenue act for at least another year from January 1 next, it is believed the leaders will endeavor to amend it so as to increase its revenue-producing capacity and will also have in mind the probable permanency of some of its chief provisions. The increase in the beer tax of 50 cents per barrel promises to net about $25,000,000, and it is more than probable this increase will be retained indefinitely. Schedule A, which includes documentary stamp taxes, etc., may be counted upon for about $30,000,000, and one proposition now under consideration involves the careful revision of this schedule so as to eliminate the most vexatious of these taxes with a view to retaining the greater part on the books for several years to come. It is thought that at least $25,000,000 per annum can thus be derived. The recasting of Schedule B, which imposes taxes on perfumery, cosmetics, chewing gum, etc., is regarded as essential to provide exemptions for such necessaries of life as soaps, dentrifices, etc., but it is urged that at least $5,000,000 can be obtained from this source without arousing any resentment on the part of tax-payers.

It will be seen, therefore, that much important revenue legislation may be enacted at the next session. The general revision of the Underwood-Simmons act, however, will probably be postponed until after the elections; but whichever party is victorious, it now seems certain, in view of the revenue requirements, that there will be a substantial increase in the average ad valorem of the revised tariff schedules. W. L. C.

The preliminary report of the Canadian Department of Mines, just issued, giving the mineral production for 1914, and prepared by John McLeish, places the nickel output at 45,517,937 lb., compared with 49,676,772 lb. in 1913. The copper produced was 75,738,386 lb., against 76,976,925 lb. in 1913. The lead output was 36,337,765 lb., against 37,662,703 lb. in 1913. The coal mined was 13,594,984 tons against 15,012,178 tons in 1913. The pig-iron and iron-ore statistics were given in *The Iron Age* of March 11, page 589.

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Decrease in Steel Corporation's Orders for March

The United States Steel Corporation's regular monthly statement of unfilled orders on its books March 31, 1915, shows a total of 4,255,749 tons as compared with 4,345,371 tons on February 28, 1915. This is a decrease of 89,622 tons or a little less than was expected by the trade which had estimated a falling off of 100,000 tons. On March 31, 1914, the unfilled tonnage was 4,653,825 tons. The following table shows the unfilled tonnage for each month beginning with the high point of December 31, 1912:

March 31, 1915	4,255,749	January 31, 1914	4,613,680
February 28, 1915	4,345,374	December 31, 1913	4,282,108
January 31, 1915	4,248,571	November 30, 1913	4,396,347
December 31, 1914	3,836,643	October 31, 1913	4,513,767
November 30, 1914	3,324,592	September 30, 1913	5,003,785
October 31, 1914	3,461,097	August 31, 1913	5,223,468
September 30, 1914	3,787,667	July 31, 1913	5,399,356
August 31, 1914	4,213,331	June 30, 1913	5,807,317
July 31, 1914	4,158,589	May 31, 1913	6,324,322
June 30, 1914	4,032,857	April 30, 1913	6,978,762
May 31, 1914	3,998,160	March 31, 1913	7,468,956
April 30, 1914	4,277,068	February 28, 1913	7,656,714
March 31, 1914	4,653,825	January 31, 1913	7,827,368
February 28, 1914	5,026,440	December 31, 1912	7,932,164

The steam boiler rules of the American Society of Mechanical Engineers meet the approval of the Industrial Commission of the State of Wisconsin. J. D. Beck, head of the commission, is arranging to publish a list of manufacturers who have stated that in the future all their boilers will be built to conform to these rules, whether they are required to do so by legislation or not.

The Iron and Metal Markets

EXPORTS STILL EXPAND

Domestic Buying Less Than Consumption

Prices of Shapes, Plates and Bars Better Maintained Than Was Expected

The steel trade is going on in its own orderly way, scarcely measuring up to the scale of prosperity attributed to it in some quarters. Consumption, which seems to be gradually increasing, counting in steel that is going abroad, is for the time being greater than new buying.

The expansion in export business has been marked in the past six weeks. March contracts with foreign buyers of iron and steel products were probably in excess of 250,000 tons, not including 100,000 tons of shrapnel bars recently closed for France. No order has yet been placed here for 40,000 tons of rails for France, as reported, and the fantastic story of a large French order for bridges to span the Rhine scarcely needs denial.

A vast amount of shrapnel business has been and is still being distributed in this country by a Canadian interest which has an $80,000,000 contract with Russia, but with this, as with a good deal else in war supply lines, there are complications which make negotiations long drawn out. The disposition is growing to proceed very conservatively in regard to war contracts where many intermediaries are at work.

With half of April gone, there is some light on the situation as to prices of plates, shapes and bars, which were advanced to 1.20c., Pittsburgh, by leading manufacturers. Less weakness has appeared than a part of the trade predicted, yet new business in these lines is still limited. Sales of bars and shapes have been made at 1.20c., Pittsburgh, and Pittsburgh mills have taken plate business at 1.15c., while some Ohio plate mills have sold as low as 1.10c. Pittsburgh.

Some interest is shown in agricultural contracts for bars, but at 1.20c., Pittsburgh, the price is now $2 a ton above that at which most of last year's business was placed. Some concessions have been made in recent sales of reinforcing bars.

At Chicago, plate mill operations have been at a limping rate, so little car work coming out, and one mill was idle all of last week. The Chicago & Northwestern has decided to buy 2000 box cars and 50 steel passenger cars.

Surprisingly, fabricating contracts booked in March, including elevated work and several large jobs figured on in preceding months, ran up to 64 per cent. of a month's capacity, figured on the basis of 2,100,000 tons a year. In the eight months of the war, the average of such work has been less than 35 per cent. of capacity.

In the lighter steel products the market has gone on in a humdrum way. Sheets have developed some weak spots, especially in galvanized, which have been offered to jobbers at 3.25c. to 3.30c. at Central Western mill. Tin plate shipments in March were the largest for one month in over a year. Wire products are less active, particularly fencing, and there is no indication of speculative buying.

A differential has developed in the sheet-bar trade, Bessemer bars having sold at $20, Youngstown, as against $19.50 for open-hearth. American billets have sold at 135s. c.i.f. Liverpool, or $32.85, and even at present freights such business is quite attractive.

Reports agree that the melt of foundry iron is gradually increasing, due chiefly to the larger operation of machinery foundries. The malleable trade mends more slowly.

Southern furnaces have generally succeeded in holding the $9.50 basis for No. 2 iron, though pipe interests set out to establish a $9 price in their recent buying. Sales of one Alabama interest were 75,000 tons in one week of the movement.

One eastern Pennsylvania steel company has bought 45,000 to 50,000 tons of basic iron in the past week. Furnaces had little success in the effort to get an advance, most of this iron going at or below $13.25 delivered. In the Chicago district some basic iron has been sold for St. Louis delivery and 10,000 tons is still pending at St. Louis.

The British market is dominated by Government demand and the difficulty of getting fuel to the furnaces. In Scotland a search is on for spare plant to go on war munitions and private work is displaced in all directions by Government contracts. This is especially marked at shipyards.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics

At date, one week, one month, and one year previous.

	Apr. 14, 1915.	Apr. 7, 1915.	Mar. 17, 1915.	Apr. 15, 1914.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia....	$14.25	$14.25	$14.25	$15.00
No. 2, Valley furnace....	12.75	12.75	13.00	13.25
No. 2 Southern, Cin'ti....	**12.40**	12.15	12.15	13.75
No. 2, Birmingham, Ala..	**9.50**	9.25	9.25	10.50
No. 2, furnace, Chicago*.	13.00	13.00	13.00	14.25
Basic, del'd, eastern Pa..	*13.25*	13.50	13.50	14.25
Basic, Valley furnace....	12.50	12.50	12.50	13.00
Bessemer, Pittsburgh....	14.55	14.55	14.55	14.90
Malleable Bess., Ch'go*..	13.00	13.00	13.00	14.25
Gray forge, Pittsburgh...	13.45	13.45	13.45	13.65
L. S. charcoal, Chicago..	15.75	15.75	15.75	15.25
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh.	20.00	20.00	19.50	21.00
O.-h. billets, Pittsburgh..	20.00	20.00	19.50	21.00
O.-h. sheet bars, P'gh...	21.00	21.00	20.50	22.00
Forging billets, base, P'gh	25.00	25.00	24.00	25.00
O.-h. billets, Phila.....	21.52	21.52	21.52	23.40
Wire rods, Pittsburgh...	25.00	25.00	25.00	26.00
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	*11.75*	12.00	12.00	12.75
Iron rails, Philadelphia..	13.00	13.00	13.00	15.50
Carwheels, Chicago	9.75	9.75	10.00	11.50
Carwheels, Philadelphia.	11.00	11.00	11.00	12.00
Heavy steel scrap, P'gh..	*11.75*	12.00	12.00	11.50
Heavy steel scrap, Phila.	11.00	11.00	10.50	11.00
Heavy steel scrap, Ch'go.	9.00	9.00	9.75	9.50
No. 1 cast, Pittsburgh...	12.00	12.00	11.25	11.50
No. 1 cast, Philadelphia.	12.00	12.00	12.00	13.00
No. 1 cast, Ch'go (net ton)	9.00	9.00	9.00	10.25
Finished Iron and Steel.				
Per Lb. to Large Buyers:	Cents	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia..	1.15	1.15	1.15	1.22½
Iron bars, Pittsburgh....	1.20	1.20	1.10	1.30
Iron bars, Chicago.....	1.15	1.15	1.10	1.12½
Steel bars, Pittsburgh...	1.20	1.20	1.15	1.15
Steel bars, New York....	**1.369**	1.319	1.319	1.31
Tank plates, Pittsburgh..	1.15	1.15	1.10	1.15
Tank plates, New York..	**1.319**	1.269	1.269	1.31
Beams, etc., Pittsburgh..	1.20	1.20	1.15	1.15
Beams, etc., New York..	**1.369**	1.269	1.269	1.31
Skelp, grooved steel, P'gh	1.12½	1.12½	1.10	1.20
Skelp, sheared steel, P'gh	1.17½	1.17½	1.15	1.25
Steel hoops, Pittsburgh..	1.25	1.25	1.25	1.25

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, Connellsville,

Per Net Ton at Oven:	Apr. 14, 1915.	Apr. 7, 1915.	Mar. 17, 1915.	Apr. 15, 1914.
Furnace coke, prompt....	$1.50	$1.50	$1.50	$1.90
Furnace coke, future....	1.65	1.65	1.65	2.00
Foundry coke, prompt...	2.00	2.00	2.00	2.40
Foundry coke, future....	2.15	2.15	2.15	2.50

Sheets, Nails and Wire,

Per Lb. to Large Buyers:	Cents	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	1.80	1.80	1.80	1.90
Galv. sheets, No. 28, P'gh	3.25	3.30	3.40	2.90
Wire nails, Pittsburgh...	1.55	1.60	1.60	1.60
Cut nails, Pittsburgh....	1.55	1.55	1.55	1.65
Fence wire, base, P'gh..	1.40	1.40	1.40	1.40
Barb wire, galv., P'gh...	2.10	2.10	2.10	2.00

Metals,

Per Lb. to Large Buyers:	Cents	Cents.	Cents.	Cents.
Lake copper, New York.	17.75	17.25	15.25	14.75
Electrolytic copper, N. Y.	16.37½	15.87½	14.75	14.37½
Spelter, St. Louis.....	9.75	9.37½	9.12½	5.10
Spelter, New York.....	9.87½	9.62½	9.62½	5.25
Lead, St. Louis.....	4.12½	4.12½	4.00	3.67½
Lead, New York.....	4.20	4.20	4.10	3.80
Tin, New York.....	37.00	47.25	52.50	36.40
Antimony, Hallett's, N. Y.	32.00	32.00	27.00	6.75
Tin plate, 100-lb. box, P'gh	$3.25	$3.25	$3.35	$3.30

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16.9c.; Philadelphia, 15.9c.; Boston, 18.9c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal has no stability, being dependent on vessel charges.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.15c. base, net cash, 30 days. Following are stipuations prescribed by manufacturers, with extras:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in....	.10
Gauges under 3-16 in. to and including No. 8....	.15
Gauges under No. 8 to and including No. 9....	.25
Gauges under No. 9 to and including No 10.....	.30
Gauges under No. 10 to and including No. 12....	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles, 3 ft. in diameter and over.....	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft. to 2 ft. inclusive..	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive..	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.15c. to 1.20c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs.	.10
Angles, 3 in. on one or both legs less than ¼ in. thick as per steel bar card, Sept. 1, 1909.....	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909..... .20 to	.80
Deck beams and bulb angles	.30
Handrail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive..	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive..	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Products.—Prices to jobbers: Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots, annealed, $1.40; galvanized, $1.90. Galvanized barb wire and staples, $2.10; painted, $1.60. Wire nails, $1.55 to $1.60. Galvanized nails, 1 in. and longer, $1.20 advance over base price; shorter than 1 in., $1.70 advance over base price. Woven wire fencing, 72 per cent. off list for carloads; 71 off for 1000-rod lots; 70 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.50	$1.55	$1.60	$1.65	$1.75	$1.85	$1.95	$2.05
Galvanized	2.00	2.05	2.10	2.15	2.25	2.35	2.75	2.85

Wire Rods.—Bessemer, open-hearth and chain rods, $25.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from February 11, 1915, and iron pipe from February 12, 1915, all full weight:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	73	52½	⅛ and ¼	66	47
½	77	65½	⅜	65	44
¾ to 3	80	69½	½	69	54
			¾ to 2½	72	59

Lap Weld

2	77	66½	1½	56	43
2½ to 6	79	68½	1¾	67	54
7 to 12	77	66½	2	68	56
13 and 14	63½	..	2½ to 4	70	59
15	61	..	4½ to 6	70	59
			7 to 12	68	58

Reamed and Drifted

1 to 3, butt	78	67½	1 to 1½, butt	70	57
2, lap	75	64½	2, butt	70	57
2½ to 6, lap	77	66½	1¼, lap	54	41
			1½, lap	65	52
			2, lap	66	54
			2½ to 4, lap	68	57

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	68	55½	⅜	63	50
½	73	64½	½	67	58
¾ to 1½	77	68½	¾ to 1½	71	60
2 to 3	78	69½	2 and 2½	72	61

Lap Weld, extra strong, plain ends

2	74	63½	1½	65	55
2½ to 4	76	65½	2	66	57
4½ to 6	75	64½	2½ to 4	70	59
7 to 8	69	58½	4½ to 6	69	58
9 to 12	64	53½	7 to 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends

½	63	54½	½	57	47
¾ to 1½	66	57½	¾ to 1½	60	50
2 to 2½	68	59½	2 and 2½	62	52

Lap Weld, double extra strong, plain ends

2	64	55½	2	58	47
2½ to 4	66	57½	2½ to 4	60	52
4½ to 6	65	56½	4½ to 6	59	51
7 to 8	59	48½	7 to 8	52	42

To the large jobbing trade an additional 5 per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts on less than carloads, f.o.b. Pittsburgh, freight to destination added, in effect from April 1, 1915, on steel, and from January 2, 1914, on iron, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1¾ and 2 in.	66	1½ in.	45
2¼ in.	63	1¾ and 2 in.	49
2½ and 2¾ in.	69	2¼ in.	45
3 and 3¼ in.	74	2½ and 2¾ in.	54
3½ and 4½ in.	75	3 and 3¼ in.	57
5 and 6 in.	68	3½ and 4½ in.	60
7 to 13 in.	65	5 and 6 in.	49

Locomotive and steamship special charcoal grades bring higher prices.

1¾ in., over 18 ft., 10 per cent. net extra.

2 in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River, must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points. On standard charcoal iron tubes for desirable orders the above discounts are shaded an extra 5, and occasionally two 5's by some makers.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30

days net, or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	1.25 to 1.30
Nos. 9 to 10	1.30 to 1.35
Nos. 11 and 12	1.35 to 1.40
Nos. 13 and 14	1.45 to 1.50
Nos. 15 and 16	1.55 to 1.60

Box Annealed Sheets, Cold Rolled

	Cents per lb.
Nos. 10 and 11	1.45 to 1.50
No. 12	1.45 to 1.50
Nos. 13 and 14	1.50 to 1.55
Nos. 15 and 16	1.55 to 1.60
Nos. 17 to 21	1.60 to 1.65
Nos. 22 and 24	1.65 to 1.70
Nos. 25 and 26	1.70 to 1.75
No. 27	1.75 to 1.80
No. 28	1.80 to 1.85
No. 29	1.85 to 1.90
No. 30	1.95 to 2.00

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11	2.25 to 2.40
No. 12	2.35 to 2.50
Nos. 13 and 14	2.35 to 2.50
Nos. 15 and 16	2.50 to 2.65
Nos. 17 to 21	2.65 to 2.80
Nos. 22 and 24	2.80 to 2.95
Nos. 25 and 26	2.95 to 3.10
No. 27	3.10 to 3.25
No. 28	3.25 to 3.40
No. 29	3.40 to 3.55
No. 30	3.55 to 3.70

Pittsburgh

PITTSBURGH, PA., April 13, 1915.

While the past week has been quiet, prices on the heavier hot rolled products, such as bars, plates and shapes, are showing more strength than expected, with the exception of plates. The leading mills are quoting 1.20c. on these products for delivery up to July, but a few mills are still naming 1.15c. on plates, and on a good specification for prompt shipment possibly a little lower could be done. Operations among the steel works this week range from 65 to 70 per cent., except in the Youngstown district, where the average is 90 or better. The new demand for the lighter forms of steel, such as sheets, wire, tin plate and tubular goods, is keeping up well, shipments of tin plate in March probably having been the heaviest in any one month for several years. There is little doing in pig iron, billets or sheet bars, but prices are firm. There is some prospective demand for coke from blast furnaces in the valleys and in the East that may resume operating in the next month or six weeks. Scrap is dull and prices are sagging. New buying in April is not expected to be as heavy as in March, and on some lines shipments will likely show a falling off.

Pig Iron.—The local market is stagnant, only a few small lots of foundry iron changing hands and for prompt shipment. The increased operations among the steel works have not helped out the merchant blast furnaces, as none of the steel companies has bought any pig iron for many months. A Westinghouse interest is expected in the market on its needs of foundry iron for the last half of the year, but its inquiry has not yet come out. Several blast furnaces in the valleys, including Canal Dover and one Shenango, may start up this month. Nominal prices of pig iron are as follows: Bessemer iron, $13.60; basic, $12.50; malleable Bessemer, $12.75; No. 2 foundry, $12.75 to $13; and gray forge, $12.50, all at Valley furnace, with a freight rate of 95c. a ton for delivery in the Cleveland and Pittsburgh districts.

Billets and Sheet Bars.—There is some demand for small billets and also ordinary 4 x 4-in. billets, the former bringing $21 and the latter about $20, maker's mill, Pittsburgh. One Youngstown mill has advised its customers that its price on Bessemer and open-hearth sheet bars and small billets for April shipment will be $20 at mill. Last week four steel plants of the Carnegie Steel Company—Duquesne, Mingo, Bellaire and Homestead—were operating to 100 per cent., and are again on full this week. Prices of steel are firm and specifications heavy. We quote Bessemer and open-hearth billets at $19, and Bessemer and open-hearth sheet bars, $19.50, f.o.b. maker's mills, Youngstown; Bessemer and open-hearth billets, $20, and Bessemer and open-hearth sheet bars, $21, f.o.b. Pittsburgh. Forging billets are quoted at $25 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 to 0.60 carbon take $1 per ton extra. Axle billets are quoted at $21 to $22.

Ferroalloys.—The local market is quiet, and there is more disposition among dealers to shade prices on ferromanganese, as it is not believed there will be much trouble as regards supply. Two or three carloads of English 80 per cent., and one small lot of domestic were sold in the past week at about $95, Pittsburgh. Consumers here believe that shipments of English ferromanaganese will be started in a short time; in fact, a cargo of about 3000 tons is reported on its way to this country. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $73; over 100 tons to 600 tons, $72; over 600 tons, $71; delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is $17; 11 per cent., $18, and 12 per cent., $19, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent, spiegeleisen at $25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads, 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

Structural Material.—New inquiry is better. The McClintic-Marshall Company has taken about 1200 tons for new buildings for the Warren City Boiler & Tank Company, Warren, Ohio. Bids have gone in on the new Loyal Order of Moose building in this city, which will take about 1500 tons. There is much complaint over the low prices named by fabricators on the small amount of work being placed, some of this having been recently figured on the plain material at about 1.05c. We quote beams and channels up to 15-in. on new orders at 1.20c., Pittsburgh, for second quarter, and 1.25c. for third quarter. It is said that several contracts have been made for third quarter at the latter price.

Plates.—While 1.20c. is being quoted by the larger mills for ¼-in. and heavier plates for second-quarter delivery, several makers are naming 1.15c., and possibly this price could be shaded on a desirable order for prompt shipment. There are no new inquiries out for cars. The steel car companies have not bought any plates for some time. The Carnegie Steel Company has taken about 2500 tons of plates and shapes for a new boat to be built at Newport News.

Steel Rails.—Reports that an Eastern rail mill had sold 30,000 tons of standard sections for shipment to France are not credited here, and nothing is known of the inquiry. The new demand for light rails is active, the Carnegie Steel Company having received new orders and specifications in the past week for nearly 3500 tons. We quote standard section rails made of Bessemer stock at 1.25c., and of open-hearth, 1.34c., f.o.b. Pittsburgh. We quote light rails as follows, in carload lots: 8 and 10 lb. section, 1.275c.; 12 and 14 lb., 1.225c.; 16 and 20 lb., 1.175c.; 25, 30, 35, 40 and 45 lb. sections, 1.125c. The prices of light rails are materially shaded on large lots, and the rerolling mills are underselling makers of rails rolled from billets from 50c. to $1 per ton.

Sheets.—The American Sheet & Tin Plate Company continues to operate to 69 per cent. of hot sheet mill capacity, and reports that its Gary plant is back from 6 to 7 weeks in deliveries on galvanized sheets. This is due partly to a shortage in supply of spelter, shipments having been made from this district recently to help out the plant. There is some foreign inquiry for galvanized sheets, and shipments to the Orient are frequent. Some independent sheet mills are operating close to 100 per cent. of capacity, and report they have a good deal of work ahead. Prices on galvanized sheets are weaker, and 3.25c. can be done on desirable orders. We quote No. 28 Bessemer black sheets at 1.80c. to 1.85c.; No. 28 galvanized at 3.25c. to 3.40c.; Nos. 9 and 10 blue annealed sheets, 1.30c. to 1.35c.; No. 30 black plate, tin-mill sizes, H. R. & A., 1.95c.; No. 28, 1.90c.; Nos. 27, 26 and 25, 1.85c.; Nos. 22 to 24, 1.80c.; Nos. 17

to 24, 1.75c.; Nos. 15 and 16, 1.70c. The above prices are for carload lots, f.o.b. at maker's mill, jobbers charging the usual advances for small lots from store.

Tin Plate.—There is very little new buying, but shipments by the mills are heavy. There is some foreign inquiry, and a large shipment left this district recently consigned to India. On the small orders being placed, makers quote from $3.25 to $3.35 for 14 x 20 coke plates, prices depending on the order and the deliveries wanted.

Wire Rods.—Foreign inquiry has almost disappeared. The domestic demand is quiet, as consumers are covered to July on contracts placed some time ago, against which specifications are moderate. Prices are firm and we quote Bessemer, open-hearth and chain rods at $25 to $26, f.o.b. Pittsburgh. One leading mill is holding firm to the higher price.

Steel Car Wheels.—No new orders are being placed for steel cars, and consequently none for carwheels. We quote standard 33-in. freight carwheels, 6¼-in. rough bore, at $15, and standard 36-in. passenger, the same bore, at $21 per wheel, f.o.b. Pittsburgh.

Shafting.—Several makers have lowered discounts two points, or to 68 per cent. off in carload lots. One or two others are quoting 69 to 70 per cent. off, but it would require a good order and prompt shipment to get the higher discount. Specifications against contracts from the automobile trade and implement makers have quieted down, but from machine-tool builders are heavy. In fact, the calls of the latter are taking a good part of the output of shafting at present. We quote cold-rolled shafting at 68 to 70 per cent. off in carload and larger lots, and 63 to 65 per cent. off in small lots, f.o.b. Pittsburgh.

Railroad Spikes.—The New York, New Haven & Hartford Railroad has placed 12,000 to 15,000 kegs of spikes with a local maker, covering its needs for the entire year. Specifications against contracts for spikes placed some time ago are not coming in as freely as expected, and shipments by makers are not as yet very heavy. We quote: Standard railroad spikes, $1.35 to $1.40; small railroad spikes, $1.45 to $1.50 in carload and larger lots, f.o.b. Pittsburgh.

Hoops and Bands.—Most consumers are covered by contracts placed some time ago at 1.10c. to 1.15c. for bands, and as a result there has been very little new buying so far at the 1.20c. price quoted for second quarter. Specifications against contracts for steel hoops are fairly active. We quote steel bands at 1.20c. on new orders for second quarter shipment, and 1.25c. for third quarter, and steel hoops at 1.25c. to 1.30c. at mill.

Skelp.—Several sales of grooved steel and sheared iron skelp, aggregating 10,000 to 12,000 tons, have been made in this market recently. Skelp mills are busier than for a long time and prices are firm. We quote: Grooved steel skelp, 1.12½c. to 1.15c.; sheared steel skelp, 1.17½c. to 1.20c.; grooved iron skelp, 1.50c. to 1.55c.; sheared iron skelp, 1.60c. to 1.65c., delivered to consumers' mills in the Pittsburgh district.

Wire Products.—Foreign inquiry for barb wire has quieted down, but the mills in this district still have a large amount of foreign business on their books on which shipments are going forward regularly. Two leading concerns report they are operating to 100 per cent. and have their product sold ahead for six weeks to two months. Specifications from domestic consumers are fairly active, but, starting about May 1, the wire trade will no doubt show a seasonable falling off. Prices on wire nails are unsteady, some new orders having been placed at $1.55 at mill. Makers quote to jobbers on new orders as follows: Wire nails, $1.55 to $1.60; galvanized nails, 1 in. and shorter, taking an advance of $1.70 over this price, or $3.30, and galvanized nails, 1 in. and longer, an advance of $1.20, or $2.80; plain annealed wire, $1.40; galvanized barb wire and fence staples, $2.10 to $2.20; painted barb wire, $1.60, all f.o.b. Pittsburgh, freight added to point of delivery, terms 30 days net, less 2 per cent. for cash in 10 days. We quote woven wire fencing at 72 per cent. off in carload lots, 71 per cent. off on 1000-rod lots and 70 per cent. on small lots, f.o.b. Pittsburgh.

Iron and Steel Bars.—Shipments of steel bars by the Carnegie and Jones & Laughlin companies in March were the heaviest in any one month for more than a year. The Duquesne works of the Carnegie Company is operating to 100 per cent. of capacity, a good part of its output being merchant steel bars; it is also making small shapes and sheet bars. An inquiry from France is in the market for 30,000 to 35,000 tons of 3¼-in. rounds for shrapnel. The new demand for reinforcing steel bars is active, one order for 1800 tons having been placed recently with a local mill. The new demand for common iron bars is a little better and mills report they are obtaining higher prices on new orders. We quote steel bars on new orders at 1.20c. for second quarter delivery, and 1.25c. for third quarter. We quote common iron bars, made from part scrap, at 1.20c., and test iron bars at 1.30c., f.o.b., Pittsburgh.

Merchant Steel.—The new demand is heavier than for some time, and specifications against contracts are more active. One maker reports that its shipments in March were the heaviest in any one month for nearly two years. Prices are firm and on small lots are as follows: Iron finished tire, ½ x 1½ in. and larger, 1.30c. base; under ½ x 1½ in., 1.45c.; planished tire, 1.50c.; channel tire, ¾ to ⅞ and 1 in., 1.80c. to 1.90c.; 1⅛ in. and larger, 1.90c.; toe calk, 1.90c. to 2c. base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c.

Cold-Rolled Strip Steel.—Makers report specifications against contracts active, with new demand better than for some time. Prices are firm and one leading maker states it is quoting $2.85 base on most of its new inquiries. We quote hard-rolled steel, 1½ in. and wider, under 0.20 carbon, sheared or natural mill edges, per 100 lb., $2.75, delivered. Extras, which are standard among all the mills, are as follows:

Thickness, in.	Extras for thickness	Extras for soft or intermediate tempers	Extras for straightening and cutting to lengths not less than 24 in.
0.100 and heavier	Base	$0.25	$0.10
0.099 to 0.050	$0.05	0.25	0.15
0.049 to 0.035	0.20	0.25	0.15
0.034 to 0.031	0.35	0.40	0.25
0.030 to 0.025	0.45	0.40	0.40
0.024 to 0.020	0.55	0.40	0.50
0.019 to 0.017	0.85	0.50	1.10
0.016 to 0.015	1.25	0.50	1.10
0.014 to 0.013	1.95	0.50	1.25
0.012	2.30	0.50	coils only
0.011	2.65	0.50	coils only
0.010	3.00	0.50	coils only

Nuts and Bolts.—Makers state that the discounts on nuts and bolts recently adopted are being held, but the new demand is light and mostly for small lots, consumers being covered up to July on contracts placed some time ago. Discounts to the large trade are as follows:

U. S. S. Cold Punched Blank and Tapped, Chamfered, Trimmed and Reamed

½ in. and smaller hex.....8.2c. per lb. off
⅝ in. and larger hex.....7.4c. per lb. off
Square, all sizes.....5.9c. per lb. off

Semi-Finished

½ in. and smaller hex.....85-10-10-10 off
⅝ in. and larger hex.....85-10-10 off

Black Bulk Rivets

7/16 x 6½, smaller and shorter.....80-10-5 off

Package Rivets 100 Pcs.

Black, metallic tinned and tin plated....75-10-10 off

Rivets.—The new demand is quiet for both structural and boiler rivets and mostly for small lots to cover actual needs. It is claimed that in many cases rivets are being sold at less than cost. We quote structural rivets at 1.40c., and conehead boiler rivets at 1.50c., f.o.b. Pittsburgh. On a desirable order these prices might be shaded about $1 per ton.

Wrought Pipe.—Two mills in this district report that demand for wrought steel pipe so far in April has been a little heavier than the same time in March. The LaBelle Iron Works, Steubenville, Ohio, has taken a contract for 90 miles of 6-in. pipe for shipment to Ponca City, Okla. Discounts on iron and steel pipe are fairly well held, but are sometimes shaded on desirable orders.

Boiler Tubes.—It is stated that the new discounts on steel boiler tubes adopted April 1 are being held and more accurately represent the actual market prices ruling than did the old discounts. The new demand for locomotive tubes is quiet and mostly for small lots.

Old Material.—A leading local consumer is said to have again been the purchaser of the heavy steel scrap in the Pennsylvania Railroad list on which awards were made April 9, at about $12.50 per gross ton, delivered to its mills. Since the Lake Shore was taken over by the New York Central, some of the scrap from the former line is finding its way into the Pittsburgh market, coming via Youngstown. A good deal of the Lake Shore scrap is also being bought by Youngstown mills, the price of heavy steel scrap being about $11.50, delivered there. Actual sales of scrap being made are between dealers only, who are buying to cover short sales. There is some inquiry out for low phosphorus melting stock, and prices have improved about 50c. per ton. Prices on heavy steel scrap, borings and turnings are 25c. to 50c. a ton lower. Consumers are showing very little interest in the market. For delivery in Pittsburgh and nearby districts that take Pittsburgh freights, dealers quote about as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	$11.75 to $12.00
Compressed side and end sheet scrap	10.25 to 10.50
No. 1 foundry cast	12.00 to 12.25
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	9.25 to 9.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	11.75 to 12.00
No. 1 railroad malleable stock	10.00 to 10.25
Railroad grate bars	8.50 to 8.75
Low phosphorus melting stock	13.75 to 14.00
Iron car axles	18.75 to 19.25
Steel car axles	13.25 to 13.75
Locomotive axles, steel	19.75 to 20.25
No. 1 busheling scrap	9.75 to 10.00
No. 2 busheling scrap	7.00 to 7.25
Machine shop turnings	7.75 to 8.00
Old carwheels	10.75 to 11.00
Cast-iron borings	8.25 to 8.50
*Sheet bar crop ends	12.00 to 12.25
Old iron rails	12.75 to 13.00
No. 1 railroad wrought scrap	10.75 to 11.00
Heavy steel axle turnings	8.50 to 8.75
Heavy breakable cast scrap	10.75 to 11.00

*Shipping point.

Coke.—Prices are said to have gone in on the inquiry of the Pittsburgh Steel Company for about 18,000 tons of blast furnace coke per month for a year from July 1. There is some prospective new demand for furnace coke, as six or eight merchant furnaces in the valleys and also in the East that buy Connellsville coke are expected to start up in the next month or six weeks, if the present rate of operations in steel works is maintained. The Connellsville Courier gives the output of coke in the upper and lower regions for the week ended April 3, as 281,251 tons, a decrease over the previous week of 4006 tons. We quote standard makes of blast-furnace coke for prompt shipment from $1.50 to $1.60; on contracts for delivery up to July 1, $1.65, and for delivery over all of 1915, at $1.75 per net ton at oven. Foundry coke, standard makes, prompt, $2 to $2.25; contracts, $2.15 to $2.30.

Chicago

CHICAGO, ILL., April 14, 1915.—(*By Wire.*)

The progress of business from week to week is marked neither by regularity nor outstanding features. That the net volume of specifications and orders, when averaged from all lines, shows an increase is about all that can be said. Last week new business in structural material, good specifications for track supplies from the railroads, including a new order for 5000 tons of tie plates, and substantial orders for steel bars and sheets overbalanced deficiencies in other directions. Fabricators report the taking of nearly 7000 tons of new work, and in addition 1100 tons for a pier at Chicago is about to be placed. The higher level to which prices have been advanced offers indication of permanence, so far as a fair amount of carload business has constituted a test, and the appearance of some of the implement interests in the attitude of feeling out the situation reflects an awakening of buyers to the improvement that has been effected. The old material market is featureless; there is very little buying and prices are lamentably weak. While on the whole the pig-iron market is not active, a number of interesting transactions in both Northern and Southern iron have been negotiated.

Pig Iron.—The price of local irons is open to but little question on the basis of $13 at the furnace, except that a wide range of specifications is being quoted on this basis. The interest which has been most active has closed several round lots of both basic and foundry iron and is approaching a condition where it has little surplus iron to sell. In the Milwaukee district transactions involving 1500 tons each of Northern basic and Southern foundry have been prominent and at Chicago, in addition to the lot of 5000 to 6000 tons of basic for St. Louis delivery another melter has taken a small tonnage. Negotiations for Southern iron have been especially interesting, and the furnace attitude has been one of mingled weakness and strength in which concessions have been made on the one hand to secure tonnage with which to strengthen the market on the other. It is understood, however, that the pipe companies were not successful buyers in the campaign for a $9 Birmingham price for No. 2 iron; for ordinary purchases the market seems clearly on the basis of $9.50. Ohio silvery irons in this market show a decided weakness and we have revised quotations. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace, and do not include a switching charge averaging 50c. a ton:

Lake Superior charcoal, Nos. 2 to 5	$15.75
Lake Superior charcoal, No. 1	16.25
Lake Superior charcoal, No. 6 and Scotch	16.75
Northern coke foundry, No. 1	$13.25 to 13.50
Northern coke foundry, No. 2	13.00 to 13.25
Northern coke foundry, No. 3	12.50 to 13.00
Southern coke, No. 1 f'dry and 1 soft	13.75 to 14.25
Southern coke, No. 2 f'dry and 2 soft	13.50 to 13.75
Malleable Bessemer	13.00 to 13.25
Standard Bessemer	15.50
Basic	12.50 to 13.00
Low phosphorus	20.00 to 20.50
Jackson Co. and Ky. silvery, 8 per cent	16.90
Jackson Co. and Ky. silv'y, 10 per cent	17.90

(*By Mail*)

Rails and Track Supplies.—New rail orders entered at Chicago last week were but little in excess of 1000 tons, but specifications against old contracts were several times that tonnage. The feature of the week in railroad buying was the receipt of excellent specifications for track fastenings—spikes, bolts and angle bars. An order was placed for 5000 tons of tie plates for prompt shipment. We quote standard railroad spikes at 1.45c. to 1.50c., base; track bolts with square nuts, 1.90c., base, all in carload lots, Chicago; tie plates, $23.50 to $25; f.o.b. mill, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.07c.; 16 to 20 lb., 1.12c.; 12 lb., 1.17c.; 8 lb., 1.22c.; angle bars, 1.50c., Chicago.

Structural Material.—The tonnage of fabricated steel work grows steadily, even though large work is lacking. Of this, the specifications for steel coming to the mills offer a good index. The South Halsted Street Iron Works took 900 tons for a local school building, the Vierling Steel Company has new orders aggregating 500 tons, the Chicago Bridge & Iron Company will fabricate 767 tons for a bridge over the Pan Handle tracks at Chicago and the Gage Structural Steel Company has a job of 113 tons for the Gary, Ind., postoffice. The Palm Iron Works, Johnson Brothers and the Mead-Morrison Mfg. Company participated in three contracts, aggregating 1400 tons, for erection on the Pacific coast where, also, the Judson Mfg. Company has received the order for 2500 tons for the Rainier Brewery, at San Francisco. The Milwaukee Structural Steel Company took an order last week for about 300 tons of Bethlehem shapes. Bids on the general contract for the new recreation pier at Chicago were opened today. About 1100 tons of steel is involved. Car buying presents no new developments, and of the three Western inquiries now under consideration, calling for an aggregate of about 3000 cars, only one shows any evidence of possible early closing. With the trade largely covered by contract, the testing of the 1.20c, Pittsburgh, price has been limited to a few small orders, but in these instances

that figure has been maintained. We quote for Chicago delivery of structural shapes from mill 1.30c., on contract, to 1.389c. for the second quater and 1.439c. for the last half.

The uncertainty which attends building at Chicago, pending the settlement of threatened strikes in the building trades, continues to make itself felt, particularly in trade out of store, as the steel work for most of the apartment buildings is bought out of stock. We quote for structural material from jobbers' stocks 1.75c.

Plates.—As an indication of the meager business in plates coming out in this market, one of the local mills was down all of last week and is starting up again with insufficient bookings to insure a full week's rolling. Considerable irregularity in prices is an attendant condition. For plates from mill, for second quarter delivery against contracts, we quote 1.33c. to 1.339c., for new orders 1.389c., and for last half 1.439c.

We quote for plates out of store 1.75c.

Sheets.—The wide variety of uses which manufactures in this territory afford for sheets makes for a more sustained demand than is true of most other products, and sales of attractive tonnages are reported for the past 10 days in both black and galvanized. Of the latter, there is a somewhat freer selling, and quotations down to 3.25c., at the mills, are being made for desirable orders. Prices as low as this, on the basis of the present cost of spelter, compare with the unprofitable basis at which black sheets are still selling, and some mills are accordingly unwilling to do better than 3.40c., Pittsburgh. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.489c.; No. 28 black, 1.939c.; No. 28 galvanized, 3.439c. to 3.589c.

We quote for Chicago delivery from jobbers' stocks as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.55c.; No. 28 galvanized, 3.65c. to 3.75c.

Bars.—Evidences of preliminary skirmishing in the matter of implement bar contracts for the coming year are already beginning to appear, induced, doubtless, by the advances in quotations in the past two months. The maintenance of the price now quoted would mean contracts $2 a ton higher than obtained, generally, last year. Iron tonnage is very light and hard-steel orders are scarcely enough to keep the mills running from day to day. New orders for soft-steel bars in carload lots have been taken at 1.20c., Pittsburgh, and at Chicago, hard-steel bars have brought 1.25c., at the mill. We quote for mill shipments as follows: Bar iron, 1.15c.; soft steel bars, 1.30c. to 1.389c.; hard steel bars, 1.20c.; shafting, in carloads, 65 to 68 per cent. off; less than carloads, 60 to 65 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 62 per cent. off.

Rivets and Bolts.—Business in these lines is practically limited to contract specifications, which are reported as coming in in decidedly satisfactory volume. Quotations are as follows: Carriage bolts up to ⅝ x 6 in., rolled thread, 80-15; cut thread, 80-10; larger sizes, 75-17½; machine bolts up to ⅝ x 4 in., rolled thread, 80-20; cut thread, 80-15; larger sizes, 80-2½; coach screws, 85-2½; hot pressed nuts, square, $6.60 to $6.40 off per cwt.; hexagon, $7.60 to $7.30 off per cwt. Structural rivets, ¾ to 1¼ in., 1.50c. to 1.55c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2c.; boiler rivets, 2.10c.; machine bolts up to ⅝ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to ⅝ x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square, $6, and hexagon, $6.70 off per cwt.

Wire Products.—Something of a lull is noted in wire specifications, particularly as applied to fencing. This holding back on the part of dealers may be due to the expectation of fall dating, usually granted on late spring shipments. Wire-nail orders, on the contrary, are somewhat heavier. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, $1.589; wire nails, $1.789; painted barb wire, $1.789; galvanized barb wire, $2.289 to $2.389; polished staples, $1.789; galvanized staples, $2.289 to $2.389, all Chicago.

Cast-Iron Pipe.—New business is unimpressive. A fair tonnage of gas pipe was closed during the week, and at Jackson, Mich., James B. Clow & Son took an order for 250 tons. Award was made to a contractor of 550 tons, at Sandusky, Ohio, and on April 19, 1000 tons will be purchased at Peoria Heights, Ill. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $25.50; 6 to 12 in., $23.50; 16 in. and up, $23, with $1 extra for gas pipe.

Old Material.—The local market is featureless, and purchases of scrap by melters are a minimum in number and tonnage. Prices are sagging to lower levels, but rather from inertia than any positive tendencies. The Michigan Central Railroad has out a list of 2500 tons, and the Lake Erie & Western is selling 1500 tons of rerolling rails. It is understood that the scrap on previous lists has been fairly well absorbed despite the limited requirements of the real consumers. We quote for delivery at buyers' works, Chicago and vicinity, all frieght and tranfer charges paid, as follows:

	Per Gross Ton	
Old iron rails	$11.75 to	$12.25
Old steel rails, rerolling	10.25 to	10.75
Old steel rails, less than 3 ft	10.00 to	10.50
Old carwheels	9.75 to	10.00
Heavy melting steel scrap	9.00 to	9.25
Frogs, switches and guards, cut apart	9.00 to	9.25
Shoveling steel	8.50 to	8.75
Steel axle turnings	7.00 to	7.25
	Per Net Ton	
Iron angles and splice bars	$11.50 to	$12.00
Iron arch bars and transoms	11.75 to	12.25
Steel angle bars	8.50 to	8.75
Iron car axles	13.25 to	13.75
Steel car axles	10.50 to	11.00
No. 1 railroad wrought	8.50 to	8.75
No. 2 railroad wrought	8.00 to	8.50
Cut forge	8.00 to	8.50
Steel knuckles and couplers	8.00 to	8.50
Steel springs	8.75 to	9.25
Locomotive tires, smooth	8.50 to	9.00
Machine shop turnings	5.00 to	5.25
Cast borings	4.75 to	5.25
No. 1 busheling	7.25 to	7.75
No. 2 busheling	6.25 to	6.75
No. 1 boilers, cut to sheets and rings	5.50 to	6.00
Boiler punchings	8.25 to	8.50
No. 1 cast scrap	9.00 to	9.25
Stove plate and light cast scrap	7.75 to	8.00
Grate bars	7.50 to	7.75
Railroad malleable	8.00 to	8.25
Agricultural malleable	7.25 to	7.50
Pipes and flues	6.50 to	6.75

Philadelphia

PHILADELPHIA, PA., April 13, 1915.

An expression heard on every side is that business is slightly better. There have been no especially noteworthy developments in any branch of the trade, with the exception of the purchase of at least 45,000 tons of basic pig iron by a Coatesville mill which probably will take about 10,000 tons more. Foundry irons continue quiet, particularly so far as new business is concerned. In plates, shapes and bars the unvaried quotation for the second quarter is 1.359c. for carloads, but not much is doing on this basis as the bulk of consumers protected themselves with contracts or options and are being supplied at not higher than 1.309c., Philadelphia. The exportation of steel products shows a decided increase. A recent inquiry calls for 3100 tons of bars, plates and shapes for shipment to Havre, France. Structural shapes are the poorest item on the list, though bids are asked on a building to take 3100 tons in Baltimore. The rail orders of the Pennsylvania Railroad are expected to appear soon.

Iron Ore.—Importations at this port in the week ended April 10 consisted of 17,950 tons from Cuba, 9798 tons from Sweden and 6266 tons from Spain. New business in foreign ore continues stagnant, but in some directions a little more interest is shown in domestic ore.

Pig Iron.—From the representatives of at least two or three furnaces a maker of plates at Coatesville, Pa., has bought upward of 45,000 tons of basic pig iron and it is his intention to take altogether 50,000 tons. The deliveries specified range from prompt into the third quarter. The prices paid are understood to have varied with the location of the furnaces from which the iron is to come, and $13.25, delivered, is believed to be nearer the average price paid than $13.50. It is now learned that several thousand tons of basic which were sold a few months ago, the seller being an Eastern steel company, went at $13. A fair business has been done in

odds and ends of foundry irons, though in this direction the market is not greatly changed from its status of recent weeks. Sellers are finding encouragement in the willingness with which consumers are taking deliveries. In cases, they are taking some of the Buffalo iron on which last half delivery was specified. Prices are firm. A sale of 300 tons of No. 2 X Buffalo iron was made in the week at $13 for third quarter delivery. This price is equal to $15.58, delivered, Philadelphia. Low phosphorus continues dull, although the trade is almost daily in receipt of inquiries for export, but high freight rates and shortage of cargo space restricts such business. Sample lots continue to be sent abroad. Quotations for standard brands for early delivery in buyers' yards in this district are as follows:

Eastern Penna. No. 2 X, foundry	$14.25 to $14.50
Eastern Penna. No. 2 plain	14.00 to 14.25
Virginia, No. 2 X, foundry	15.25
Virginia No. 2 plain	15.00
Gray forge	13.25 to 13.50
Basic	13.25 to 13.50
Standard low phosphorus	20.00 to 20.50

Ferroalloys.—Several thousand tons of ferromanganese are on the way to this country, consigned to the representatives of various English producers, but there is a dearth of information as to th eactual quantity and also as to the ships. Practically all of this material will be hurried inland to fill old contracts. Those who have small stocks of 80 per cent. are asking from $100 to $125 per ton. Quotations for 50 per cent. ferrosilicon are unchanged at $71 to $73, Pittsburgh.

Bars.—New business in steel bars is quiet, which is to be expected in view of the advance to 1.359c., Philadelphia, April 1, but there have been a number of small transactions at the new price. The larger consumers took care to get their specifications on record at 1.259c., Philadelphia. Inquiries are coming out for excellent quantities for export, though many of them are from domestic export houses and turn out to be duplications. Iron bars are quoted at 1.15c. to 1.20c., Philadelphia.

Plates.—A representative maker is operating his mill at 85 per cent. capacity and is quoting 1.359c., Philadelphia, for this quarter and 1.409c. for third quarter. Business continues to be of a miscellaneous character, with the railroads a poor factor. Additional export sales have been made.

Rails.—The rail committee of the Pennsylvania Railroad held a meeting April 9 and there are indications that the company will place orders against its requirements at an early date. No orders of importance are reported for the week. There is considerable inquiry out for girder rails, both in the East and West. Probably 3400 tons are inquired for by Eastern roads, while the Chicago City Railways will soon place an order for 20,000 tons.

Structural Material—Bids have been asked for about 3100 tons of fabricated steel for a 21-story building to be erected in Baltimore by the Consolidated Gas & Electric Company. In general the market continues quiet, and there is not much doing at the new quotation of 1.359c., Philadelphia.

Sheets.—The demand shows improvement, partly because Western automobile makers are running short of material and are coming East for it. Some of them, however, are disinclined to meet quoted prices, which in this district are based on 1.459c. to 1.509c., Philadelphia, for No. 10 blue annealed.

Billets.—Specifications continue to show betterment. Some further export sales have been made. The quotation is $21.52 for open-hearth rolling billets, although a tendency is shown to advance the price 50c. a ton. Forging steel is quoted $4 to $5 a ton higher than steel for rolling.

Coke.—The market presents nothing of interest. Quotations for prompt delivery Connellsville furnace coke are $1.50 to $1.65 per net ton at oven. Contract furnace to the end of the year is quoted at $1.75. Prompt foundry ranges from $2 to $2.50. Freight rates from the principal producing districts are as follows: Connellsville, $2.05; Latrobe, $1.85, and Mountain, $1.65.

Old Material.—Despite the comparative lack of business the market is fairly firm. In heavy melting steel 1000 tons has been taken by an eastern Pennsylvania mill at $11.25 and for off grade $11 has been paid. The trade is receiving inquiries for export, particularly to Italy, but has been unable to do much because delivery at Genoa is desired and cargo space is scarce. Plenty of scrap is being offered both by the railroads and the Government navy yards. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates from 35c. to $1.35 per gross ton, are as follows:

No. 1 heavy melting steel	$11.00 to $11.25
Old steel rails, rerolling	11.00 to 11.50
Low phos. heavy melting steel scrap	14.25 to 14.50
Old steel axles	14.00 to 14.50
Old iron axles	17.50 to 18.00
Old iron rails	13.00 to 14.00
Old carwheels	11.00 to 11.50
No. 1 railroad wrought	12.75 to 13.25
Wrought-iron pipe	10.00 to 10.50
No. 1 forge fire	8.00 to 8.50
Bundled sheets	9.00 to 9.50
No. 2 busheling	7.75 to 8.25
Machine shop turnings	8.25 to 8.75
Cast borings	8.00 to 8.50
No. 1 cast	11.75 to 12.25
Grate bars, railroad	8.75 to 9.25
Stove plate	8.75 to 9.25
Railroad malleable	9.00 to 9.50

Cleveland

CLEVELAND, OHIO, April 13, 1915.

Iron Ore.—Sellers are showing considerable activity in their efforts to take orders subject to the season's prices when established, but furnacemen are as yet taking little interest in the market. That prices will be the same as a year ago is still the prevailing opinion. Iron ore is beginning to move from the mines to Lake Superior ports and Escanaba and the first cargo is scheduled to be loaded next Saturday. Shipments from lower Lake docks to furnaces have improved considerably, as compared with March. We repeat 1914 prices as follows: Old range Bessemer, $3.75; Mesaba Bessemer, $3.50; old range non-Bessemer, $3; Mesaba non-Bessemer, $2.85.

Pig Iron.—Some of the smaller consumers are closing contracts for foundry iron for the last half in lots of 500 tons and under, and one northern Ohio inquiry is pending for 750 tons. One seller reports several small lot sales of foundry iron aggregating about 4000 tons. The melt shows some further improvement, and most producers are shipping as much iron as they are making. Valley furnaces are quoting No. 2 foundry iron for delivery in this territory at $12.50 at furnace for the last half and the same price is being named in Cleveland for outside shipment. Some local business has been taken at $13.25, delivered, which is the minimum quotation for No. 2 for early delivery and the last half. Southern iron at $9.25, Birmingham, for prompt shipment is not so much in evidence as it was a week or two ago, although some iron can still be had at this price for spot shipment with cash payment. Several small lot sales for early delivery are reported at $9.50, and some contracts have been placed for a Southern grade that usually commands a premium, at $9.75 for the last half. We quote, delivered Cleveland, as follows:

Bessemer	$14.55
Basic	13.45
Northern No. 2 foundry	$13.25 to 13.50
Southern No. 2 foundry	13.50 to 13.75
Gray forge	13.00
Jackson Co. silvery 8 per cent. silicon	16.37 to 16.62
Standard low phos. at furnace	19.75 to 20.00

Coke.—Foundries as yet are showing no interest in covering for their future requirements, and practically no contracts for the last half have been placed. A few sales of foundry coke for early delivery are reported. We quote Connellsville foundry coke for prompt shipment and contract at $2.25 to $2.50 per net ton at oven for the best grades. Furnace coke is held at $1.50 to $1.60 for prompt shipment.

Finished Iron and Steel.—Some contracts for steel bars and structural material have been placed at 1.25c., Pittsburgh, for the third quarter and additional inquiries are coming out for contracts. While most consumers have 1.15c. contracts for the second quarter, some business in small lots is being placed at 1.20c. Plates continue weak and irregular. While leading

mills are adhering to the 1.20c. Pittsburgh price and are taking some business at that price, a 1.10c. Pittsburgh quotation is being made quite freely by Ohio mills. The demand for plates for tank work is holding up well, a late inquiry being for 850 tons for tanks for 150 tank cars. Competition for steel bars for reinforcing purposes is unusually keen locally between makers of hard and soft steel bars. Prices on hard steel bars are irregular, being made down to 1.15c. or possibly lower, delivered Cleveland, and there are reports of shading prices on soft steel bars for reinforcing work. In structural lines the only contract placed is for 1900 tons for Nickel Plate track elevation work in Chicago, which went to the Pennsylvania Steel Company. A heavy volume of business in special shapes is coming from automobile manufacturers and makers of rims for automobile wheels. Specifications on sheet bars are good. A spread has developed in prices on sheet bars in Youngstown, where open-hearth sheet bars are quoted at $19.50 and Bessemer at $20 for April delivery. Some weak spots have developed in the sheet market, particularly on galvanized sheets which are being offered to jobbers at 3.25c. to 3.30c. at mill for No. 28 for the second quarter. No. 28 black sheets are quoted at 1.75c. to 1.80c. and No. 10 blue annealed at 2.30c. to 2.35c. Warehouse prices are 1.80c. on steel bars and 1.90c. on plates and structural material.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts are coming out in fairly good volume, but very little new business is being placed. Prices are firm. Rivets are quiet with quotations unchanged at 1.40c. to 1.45c., Pittsburgh, for structural and 1.50c. to 1.55c. for boiler rivets. Bolt and nut discounts are as follows: Common carriage bolts, ⅜ x 6 in., smaller or shorter, rolled thread, 80 and 15 per cent.; cut thread, 80 and 10 per cent.; larger or longer, 75 and 17½ per cent.; machine bolts with h.p. nuts, ⅜ x 4 in., smaller or shorter, rolled thread, 80 and 20 per cent.; cut thread, 80 and 15 per cent.; larger or longer, 80 and 2½ per cent.; coach and lag screws, 85 and 2½ per cent.; square h.p. nuts, black or tapped, $6.40 off; hexagon h.p. nuts, blank or tapped, $7.30 off; c.p.c. and t. square nuts, blank or tapped, $6.10 off; hexagon, ⅝ in. and larger, $7.60 off; 9/16 and smaller, $8.30 off; semi-finished hexagon nuts, ⅝ in. and larger, 85, 10, 10 and 5 per cent.; 9/16 and smaller, 85, 10, 10, 10 and 5 per cent.

Old Material.—The market is very dull and prices are weak; but there is not sufficient business to establish new prices and quotations are unchanged. Mills in Cleveland and in the Mahoning Valley are well covered and about the only transactions are between dealers. Dealers are offering $11 for heavy melting steel scrap for Youngstown delivery. A large amount of old material offered by the Lake Shore Railroad last week is understood to have gone at low prices, the heavy steel scrap bringing about $11, Youngstown. We quote f.o.b. Cleveland as follows:

Per Gross Ton

Old steel rails, rerolling	$11.00 to $11.75
Old iron rails	12.00
Steel car axles	12.00 to 12.50
Heavy melting steel	10.00 to 10.25
Old carwheels	9.75 to 10.00
Relaying rails, 50 lb. and over	22.50
Agricultural malleable	8.00 to 8.50
Railroad malleable	10.00 to 10.25
Steel axle turnings	8.75 to 9.00
Light bundled sheet scrap	8.00 to 8.50

Per Net Ton

Iron car axles	$15.50 to $15.75
Cast borings	6.00 to 6.25
Iron and steel turnings and drillings	5.50 to 5.75
No. 1 busheling new	8.50 to 8.75
No. 1 busheling old	8.25 to 8.50
No. 1 railroad wrought	9.50 to 9.75
No. 1 cast	9.75 to 10.25
Stove plate	8.00 to 8.25

The Dearborn Steel & Iron Company, with offices in the Peoples Gas Building, Chicago, has been formed by H. C. Perrine for the marketing of standard lines of finished iron and steel products in the Chicago district. The company is specializing in the sale of Toncan metal sheets and also representing the Stark Rolling Mill Company in its full line of blue annealed, one pass cold-rolled black and galvanized sheets.

Cincinnati

CINCINNATI, OHIO, April 14, 1915.—(*By Wire.*)

Pig Iron.—The local and nearby foundries are melting more iron than for some time, with the exception of stove foundries, whose operations are slightly off as compared with last year at this time. Southern iron appears to be in better demand than Northern, which is not attributable entirely to the difference in cost. Slack interest is taken in prompt shipment iron, and the only contracts of consequence are for future delivery. These orders have been placed cautiously, and, as a rule, buyers are not willing to commit themselves very far ahead. There are no indications of a heavy buying movement for the latter part of the month, as was freely predicted 30 days ago. Consumers have not the usual incentive for placing orders, but in the face of the light demand both Southern and Northern furnaces have stiffened quotations. Southern No. 2 foundry is held at $9.50 Birmingham basis, for prompt shipment, and while it is stated that an advance of 25c. is asked for last half this has not been obtained except where a few special brands were concerned. Inquiries for Southern iron include one for 2000 tons for a foundry in Chicago territory. An Ohio melter is also asking for 1000 tons for last half. Indiana and Michigan consumers have been fairly good buyers lately, but the largest foundry iron sale reported is 800 tons for July-December shipment. Ohio silvery irons have been active, and two sales of approximately 1000 tons each were made by local firms. Malleable shows some signs of improvement; a consumer in this territory covered for last half requirements, taking about 5000 tons. Based on freight rates of $2.90 from Birmingham and $1.26 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	$12.90 to $13.40
Southern coke, No. 2 f'dry and 2 soft	12.40 to 12.90
Southern coke, No. 3 foundry	11.90 to 12.40
Southern No. 4 foundry	11.40 to 11.90
Southern gray forge	10.90 to 11.40
Ohio silvery, 8 per cent. silicon	16.01 to 16.26
Southern Ohio coke, No. 1	15.01 to 15.51
Southern Ohio coke, No. 2	14.01 to 14.51
Southern Ohio coke, No. 3	13.76 to 14.01
Southern Ohio malleable Bessemer	14.26
Basic, Northern	14.26
Lake Superior charcoal	15.25 to 17.25
Standard Southern carwheel	26.90 to 27.40

(*By Mail*)

Coke.—Specifications on foundry coke contracts are reported to be on the mend. The jobbing foundries are consuming more than their regular requirements, as quite a number of them are operating at full capacity and in a few cases on overtime. The stove foundries also report some improvement. Foundry coke is firmer in all three fields. Connellsville 72-hr. coke is still obtainable around $2 per net ton at oven for prompt shipment, but the majority of producers are asking $2.15 to $2.25. Contract quotations range from $2.10 to $2.40. Wise County and Pocahontas operators are quoting $2.40 to $2.60 for either prompt or contract shipment.

Finished Material.—The mills close by are now willing to take contracts for No. 28 black sheets around 1.80c. to 1.85c., Pittsburgh, with shipments somewhat extended. Galvanized sheets are firm at from 2.35c. to 2.40c., Pittsburgh, for prompt shipment only. The spelter situation has not yet cleared up. The Newport Rolling Mill Company, Newport, Ky., reports that its 10 mills are now operating on full time. The American Rolling Mill Company at Middletown, Ohio, is also running a full force in its sheet departments. Mill agencies report continued improvement in the inquiry for structural shapes and reinforcing concrete bars. Hoops and bands are in better demand, and it seems to be the general opinion of the trade that the gradual advances recently quoted will not only stick, but that a further advance is imminent. The local store price on steel bars and small structural shapes is unchanged at 1.80c. There has been an almost phenomenal demand for poultry netting and wire fencing from the hardware trade.

Old Material.—While it is reported that a large quantity of scrap was recently sold in this territory by railroads, no confirmation of this can be obtained. The consumption of certain kinds of scrap has lately in-

creased in both the foundries and rolling mills, but the supply on hand in dealers' yards and for sale by the railroads tends to hold prices at the present low level. The minimum figures given below represent what buyers are willing to pay for delivery in their yards, Cincinnati and southern Ohio, and the maximum quotations are dealers' prices, f.o.b. at yards:

Per Gross Ton		
Bundled sheet scrap	$6.25 to	$6.75
Old iron rails	10.50 to	11.50
Relaying rails, 50 lb. and up	19.25 to	19.75
Rerolling steel rails	9.75 to	10.25
Melting steel rails	8.50 to	9.00
Heavy melting steel scrap	8.50 to	9.00
Per Net Ton		
No. 1 railroad wrought	$8.50 to	$9.00
Cast borings	4.50 to	5.00
Steel turnings	4.50 to	5.00
Railroad cast scrap	9.00 to	9.50
No. 1 machinery cast scrap	10.25 to	10.75
Burnt scrap	6.50 to	7.00
Old iron axles	13.50 to	14.00
Locomotive tires (smooth inside)	8.50 to	9.00
Pipes and flues	5.75 to	6.25
Malleable and steel scrap	7.00 to	7.50
Railroad tank and sheet scrap	5.00 to	5.50

Birmingham

BIRMINGHAM, ALA., April 12, 1915.

Pig Iron.—Toward the end of last week the local iron makers seemed to feel more actual optimism than for months. Peculiarly stimulating was the action of as many as four operators in turning down an offer of $9.25 for 5000 tons for second half delivery. Similar action was taken on a lot of 1000 tons, which was finally placed at $9.50. Efforts to secure $9.25 iron, except in a limited way and for strictly spot delivery, have been unavailing. Some iron has gone into competitive territory at $9.25, but it does not reflect the general market. Another buoyant feature is the aspect of the sales books. One interest is sold to capacity for three months, another is booked for five months and others for two to three months. The third good element of the situation is the manner in which stocks are moving out. One concern in making 1000 tons per diem and shipping 1500 tons. Inquiry is much more brisk. The stack of the Central Iron & Coal Company at Holt, which has resumed, is disposing of its high manganese and low phosphorus iron at not under $10, keeping the regular foundry iron for its pipe shops. The Clifton brand of the Alabama Company is fetching $11. Both this iron and the Holt special are used by carwheel works. No producer admits having sold any especially large tonnage to pipe people, but the latter are constant buyers owing to the satisfactory state of their business. Several thousand tons of iron and steel moved out of Birmingham recently for export and more is booked. One small lot of iron was sold for Italian delivery. The Southern foundry trade is still dull and shops are holding back in taking iron ordered, but sales are fully equal to the limited output of foundry. While some iron may still be had for strictly spot delivery below $9.50 under very favorable circumstances, we quote for second and third quarters, with fourth quarter included on lap orders, and for fourth quarter as follows:

No. 1 foundry and soft	$10.00 to	$10.25
No. 2 foundry and soft	9.50 to	9.75
No. 3 foundry	9.00 to	9.25
No. 4 foundry	8.75 to	9.00
Gray forge	8.50 to	8.75
Basic	9.50 to	10.00
Charcoal	22.50 to	23.00

Cast-Iron Pipe.—A satisfactory run of new orders and more firmness in prices are reported in the water-pipe market, with factories operating at 70 to 75 per cent. capacity, no accumulation of stocks and contracts coming in from all over the country. J. R. Lemoine, president United States Cast Iron Pipe & Foundry Company, visited Birmingham the past week and inspected the additions to the Bessemer plant, which are under way and are understood to be very extensive. The plant of the National Pipe & Foundry Company at Boyle's has orders covering three months. The sanitary pipe shops are still running on a small scale. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., $20; 6-in. and upward, $18, with $1 added for gas pipe.

Coal and Coke.—The coal market is holding its own with an average production of 50 per cent. One steam coal operator is on a 75 per cent. basis. Some coke shipments are being made to the Pacific coast, but shipments to Mexico have been stopped. The by-product output is underselling the beehive 25c. to 50c. We quote beehive coke, f.o.b. oven, as follows: Furnace, $2.75 to $3; foundry, $3 to $3.50, the latter for 72-hr. coke.

Old Material.—There is a satisfactory demand for steel scrap, but cast is dull on account of slack foundry operations. We quote nominal prices, per gross ton, f.o.b. yards, as follows:

Old iron axles	$13.00 to	$13.50
Old steel axles	12.50 to	13.00
Old iron rails	12.00 to	12.50
No. 1 railroad wrought	8.50 to	9.00
No. 2 railroad wrought	7.50 to	8.00
No. 1 country wrought	8.00 to	8.50
No. 2 country wrought	7.00 to	7.50
No. 1 machinery cast	9.50 to	10.00
No. 1 steel scrap	8.00 to	8.50
Tram carwheels	8.50 to	9.00
Stove plate	8.00 to	8.50

St. Louis

ST. LOUIS, MO., April 12, 1915.

Pig Iron.—Increasing interest has developed through a number of sales, and inquiries have been for larger lots than for some time. The largest sales include 300 tons of No. 2 Southern foundry, 600 tons of Lake Superior carwheel iron and 800 tons of Northern coke carwheel iron. The largest inquiry out is for 10,000 tons of basic iron, which is being hotly competed for.

Coke.—There have been some small sales of furnace coke, but none of size. One representative reports an inquiry for 5000 tons. By-product coke is quotable at $5.20, delivered St. Louis.

Finished Iron and Steel.—The renewal of activity reported last week continues. Fabricators are buying from hand to mouth and are willing to pay the higher prices. Reinforcing bars have shown a decided improvement. In standard section steel rails a sale of 500 tons to an Arkansas road is reported and track fastenings are moving quite freely. Light rails are rather slow. Prices generally are reported strong and in some competition show that all interests are alike firm. Stock is moving freely out of warehouse at prices as follows: Soft steel bars, 1.70c.; iron bars, 1.65c.; tank plate, 1.80c.; structural material, 1.80c.; No. 10 blue annealed sheets, 2c.; No. 28 black sheets, cold rolled, 2.55c.; No. 28 galvanized sheets, black sheet gauge, 3.65c. to 3.75c.

Old Material.—Scrap shows a sagging tendency. While the prices quoted are no lower, it is chiefly because there is no business of moment and therefore no competition or other pressure to force the figures down. There has been an embargo against material at some of the mills in this district and this has also helped to add to the depression. In spite of this dealers continue optimistic and seem to feel confident that activity is nearly due. Lists out this week include one of 1200 from the Missouri, Kansas & Texas. Relaying rails are still wanted and hard to get. We quote dealers' prices f.o.b. St. Louis as follows:

Per Gross Ton		
Old iron rails	$10.50 to	$10.75
Old steel rails, rerolling	10.25 to	10.50
Old steel rails, less than 3 ft	11.50 to	12.00
Relaying rails, standard section, subject to inspection	21.00 to	23.00
Old carwheels	10.25 to	10.50
No. 1 railroad heavy melting steel scrap	9.50 to	9.75
Shoveling steel	8.75 to	9.00
Frogs, switches and guards cut apart	9.50 to	9.75
Bundled sheet scrap	6.00 to	6.25
Per Net Ton		
Iron angle bars	$10.75 to	$11.00
Steel angle bars	8.50 to	8.75
Iron car axles	14.50 to	15.00
Steel car axles	10.75 to	11.00
Wrought arch bars and transoms	11.25 to	11.50
No. 1 railroad wrought	8.25 to	8.50
No. 2 railroad wrought	8.00 to	8.25
Railroad springs	8.50 to	8.75
Steel couplers and knuckles	8.50 to	8.75
Locomotive tires, 42 in. and over, smooth inside	9.00 to	9.25
No. 1 dealers' forge	7.50 to	7.75
Mixed borings	5.25 to	5.50
No. 1 busheling	7.50 to	7.75
No. 1 boilers, cut to sheets and rings	6.25 to	6.50
No. 1 railroad cast scrap	9.50 to	10.00
Stove plate and light cast scrap	8.00 to	8.25
Railroad malleable	6.25 to	6.50
Agricultural malleable	6.00 to	6.25
Pipes and flues	6.25 to	6.50
Railroad sheet and tank scrap	6.00 to	6.25
Railroad grate bars	7.50 to	7.75
Machine shop turnings	5.50 to	5.75

San Francisco

SAN FRANCISCO, CAL., April 6, 1915.

The demand for finished materials shows less animation than was expected for the beginning of April. A gradual improvement is noted in some quarters, and there are some scattering inquiries of real importance, but thus far no sustained and general buying movement has developed. Requirements in many lines are below normal, and purchases as a rule are confined to actual needs.

Bars.—Large consumers are appearing in the market for seasonable requirements, but their purchases are considerably below the normal scale, and the gradual revival of small jobbing trade is not much noticed. The demand for both plain and corrugated bars for building has been very light. Reinforcing material now receives a little more attention, but the tonnage is not large. Prices show considerable irregularity, due to local competition. On the basis of present Pittsburgh prices, bars cannot be landed here for less than 1.82c., while jobbers can still buy from the local warehouse at 1.80c., and a local interest recently put out a price of 1.60c. Merchants are buying only for the most urgent requirements, and very little business is going to Eastern mills at the moment.

Structural Material.—Few fabricating contracts have been closed in the last fortnight, but more work is being figured than for a long time. Beyond the projects now in the market there is not much definitely in sight. The Judson Mfg. Company has a contract for a hotel at Twelfth and Market streets, requiring about 120 tons. The Seattle Brewing & Malting Company has plans out for a building in this city, which will require about 2800 tons. Plans are out for the University of California hospital, requiring about 2000 tons; and bids for fabricating work on the San Francisco public library, which will be quite a large job, will be taken April 16. Figures are also being taken for two small steel drawbridges in San Joaquin County. A local architect is drawing plans for a $100,000 Scottish Rite temple at Sacramento. Preliminary arrangements are being made for a city and county office building at Ogden, Utah. The Rudgear-Merle Company has taken the contract for ornamental iron and bronze work for the San Francisco City Hall at $93,000.

Plates.—New business is comparatively quiet, but a number of inquiries are coming out for pipe work. The Sacramento water system, for which bids will be opened April 20, will require about 40,000 ft. of heavy riveted pipe from 20 to 36 in. in diameter. The city of Los Angeles has just taken figures on a small lot of 30-in. pipe, and there are a number of similar inquiries at scattered points. It is reported that the Standard Oil Company is preparing to build 20 more storage tanks at the El Segundo refinery; and some additional business is also expected from the Shell Company. Distributive business is quiet. Jobber's carloads, from the local warehouse, are quoted at 1.85c.

Sheets.—There is a little more inquiry for blue annealed sheets. Galvanized sheets are moving better in a small jobbing way, with some increase in consuming requirements. Merchants, however, are for the most part well supplied with sheets purchased below the present prices, and little new business is being put through. The market shows somewhat less firmness, though nothing definite is heard of offers below the 3.40c. Pittsburgh basis for galvanized. One of the Panama steamship lines raised its rate on sheets April 1 to 60c. per 100 lb. from Atlantic ports, and another, which is now quoting 55c., is expected to advance shortly. It is believed that this will divert practically all shipments to the overland route.

Wrought Pipe.—The jobbing movement is gaining but slowly, and merchants, who are fairly well supplied, take little interest. Agents of some of the principal mills report current business about on a level with the last three months, the tonnage for that period being slightly better than for the same time last year. A fair number of waterworks orders are coming through from scattered points, but there is no demand in the oil fields.

Cast-Iron Pipe.—Business shows some slight improvement, with a good tonnage in prospect for the next few weeks. The Sacramento inquiry covers some 400,000 ft. of cast-iron pipe, from 4 to 18 in. in diameter. Los Angeles will take bids April 16 for about 200 tons, and San Diego is taking bids for about 500 tons. Brawley, Cal., and Douglas, Ariz., are in the market for small lots. An order for 350 tons for the Philippine Islands has been placed with the United States Cast Iron Pipe & Foundry Company. Prices at Pacific coast terminals are quoted at $34 per net ton for 4-in., $32 for 6-in. and up, and $1 extra for gas pipe.

Pig Iron.—Foundries are not yet coming into the market to any great extent, and the large offerings held by importers show little reduction, though arrivals have been light for some time. Thus far there has been nothing to indicate any important increase in foundry operations. Local steel plants use comparatively little pig iron, and the outlook for the near future offers little encouragement. Prices here are very irregular.

Coke.—Local supplies are beginning to show some decrease, but the demand is light and there is still quite a large tonnage on hand, with some foreign coke expected to arrive before long. Prices stand as before at about $12.50 per net ton, from yards, and $11 to $12 per gross ton, to arrive.

Old Material.—The market for iron and steel scrap shows no change, all lines being quiet. The foundries are taking a moderate tonnage of cast-iron scrap, principally in small lots, at about $14 to $16 per net ton. There is practically no movement of steel melting scrap at the moment, and values are uncertain.

New York

NEW YORK, April 14, 1915.

Pig Iron.—The International Steam Pump Company orders for its various plants were closed in the week, amounting to 5000 to 5500 tons, of which 1000 tons was for Cincinnati delivery. No other large transactions in foundry iron are reported. An inquiry for 300 tons of low-phosphorus pig iron has come up in the East, but little urgency is shown and it is intimated the purchase will not be made unless at attractive prices. Generally the Eastern market has been quiet in foundry iron and prices are stationary. The recent sales of basic iron in eastern Pennsylvania have not been any stimulus to prices for any kind of pig iron. The Buffalo situation is not entirely clear. One or two producers are asking $13 for No. 2 X iron at furnace, but it is not known what other furnaces, one located in western New York outside the Buffalo district, would be willing to do in response to the efforts of a number of consumers to buy iron at the low prices made in the recent Buffalo movement. Most New England foundries have taken care of their wants for some time ahead. In Virginia it is reported some pipe iron has been sold, but the movement of foundry iron is small. Prices are still generally held at $12.50 furnace for No. 2 X. The Low Moor furnace is expected to blow in this week. The Eastern foundry iron trade has not noticed so much of late the competition of iron produced by Lehigh Valley steel interests. Some figuring is going on for pipe iron and the result of these negotiations is of interest in view of the low price made last week in the eastern Pennsylvania sales of basic iron. We quote as follows at tidewater: No. 1 foundry, $14.25 to $14.50; No. 2 X, $14 to $14.25; No. 2 plain, $13.75 to $14; Southern iron, $14.50 for No. 1 and $14 to $14.25 for No. 2.

Ferroalloys.—Assurances of definite shipments of ferromanganese by British producers to their New York representatives continue to be made. Some can obtain no definite information as to when or on what boats the metal is to come, while others have advices that consignments are on board or scheduled for the Chancellor, the Dominion, the Quernmore, the Appenine, the Larchmore, and the Lord Sefton, due to arrive at Baltimore, Philadelphia, New Orleans, etc. None has yet reached this side. Without doubt the chaotic congestion in British shipping and other circles, combined

with possible reluctance on the part of some shippers to be too definite as to the movements of cargoes, are given as reasons for delays, the desire of producers to ship being unquestioned. The amount released by this temporary lifting of the embargo is variously estimated at 7500 to 10,000 tons. Advices from England are that the freight rates on manganese ore from India have quadrupled since the war and that the ore is hard to get. Some small contracts for ferromanganese for future delivery are still being made at $78, seaboard. The report that sales at $72, seaboard, for the last half had been authorized is declared untrue. Ferrosilicon, 50 per cent., continues fairly active in both domestic and foreign sales, at $71 to $73, Pittsburgh.

Structural Material.—Although the March records show that the bridge and structural shops of the country closed contracts in that month for a total of 64 per cent. of the combined monthly capacity of the shops, it is to be remembered that this does not lift the average since the European war broke out to 35 per cent. for the entire eight months. In view of this fact and with some fabricating shops operating with barely a week's work ahead and at reduced forces, it is not surprising that prices remain low. The one strengthening factor is the firm attitude of large mills which are exacting 1.20c., Pittsburgh, for new purchases of the plain material. The volume of domestic sales, to be sure, does not test prices, but with an absence of information to the contrary, we have placed the market at the 1.20c. basis. Some export business has been done at 1.15c., Pittsburgh. More fabricated work for the New York Subway system will soon be put under contract, including 4800 tons for Seventh avenue, between Fifty-first and Fifty-ninth streets, and 12,000 tons, bids due April 20, for Eastern Parkway, Brooklyn. Bids will be taken this week for about 250 tons for alterations on the Manhattan bridge. The new railroad offerings comprise 250 tons for the Philadelphia & Reading and 600 for the Pennsylvania. The steel for public school 97, Queens, 450 tons, has been closed. We quote mill shipments at 1.20c., Pittsburgh, or 1.369c., New York, and from store, 1.85c. to 1.90c., New York.

Plates.—Eastern mills appear to have several weeks scheduled on the heavier sizes, but could take considerable business to put the lighter mills and universal mills at an equally good operating rate. Prices are stiffer and 1.20c., Pittsburgh, is quoted except for larger than carload lots in competition, when 1.15c. rules. Orders are occasionally urgent, as for ship repairs, but are small on the average with a slightly greater aggregate tonnage from week to week. A round tonnage will be needed for refinery enlargements at Baton Rouge, La., for the Standard Oil Company of Louisiana. Inquiry continues for ship plates and shapes for abroad, but the specifications require study and closing is delayed. No improvement is yet forecasted in railroad car buying. We quote steel plates at 1.15c. to 1.20c., Pittsburgh, or 1.319c. to 1.369c., New York, and from store, 1.85c. to 1.90c., New York.

Steel and Iron Bars.—Some second quarter contracts have been closed within a few days on the 1.20c., Pittsburgh, basis and 1.15c., Pittsburgh, has disappeared. There are, otherwise, no new developments, but iron bars are marking time with a firmer tendency following the stronger position of steel. We quote mill shipments of steel bars at 1.20c., Pittsburgh, or 1.369c., New York, and refined iron bars 1.20c. to 1.25c., New York. Out of store in New York we quote iron and steel bars at 1.80c. to 1.85c.

Cast-Iron Pipe.—Municipal lettings continue few in number and call for but small quantities. Today a contractor's job for the city of New York will be let, requiring 238 tons of pipe, mostly 12-in. An inquiry from Cuba has been received for 550 tons of pipe and fittings, the pipe ranging from 3 to 6 in. It is stated that this inquiry is for only one-third of the quantity which will ultimately be needed for this work. Private buying shows no features of importance, save that the volume of this business is not quite so large as in the immediate past. It is noteworthy that a decided tendency to advance prices is now under way. Bids at a recent small New York letting were an average of $2 per ton above those submitted at the last previous purchase by the city. Carload lots of water pipe, class B and heavier, are now quoted at $22 to $22.50 per net ton, tidewater, for 6-in., with class A and gas pipe quoted at $1 per ton more.

Old Material.—Quiet conditions have prevailed the past week, transactions having been light and inquiries few in number. Steel companies in eastern Pennsylvania have slightly reduced their bids on steel scrap, and some of them are still requesting shipments on contracts to be deferred. Rolling mills continue to buy only sparingly. Efforts are being made to effect sales of steel scrap for Italy, but so much difficulty is encountered in securing freight room that nothing has been accomplished in this direction among local dealers. Brokers' quotations to local dealers and producers, per gross ton, New York, are as follows:

Old girder and T rails for melting	$8.50 to	$9.00
Heavy melting steel scrap	8.50 to	9.00
Relaying rails	19.00 to	19.50
Rerolling rails (nominal)	8.75 to	9.25
Iron car axles (nominal)	15.25 to	15.75
Steel car axles (nominal)	11.75 to	12.25
No. 1 railroad wrought	10.25 to	10.75
Wrought-iron track scrap	9.50 to	9.75
No. 1 yard wrought, long	9.50 to	9.75
No. 1 yard wrought, short	8.50 to	8.75
Light iron	3.25 to	3.75
Cast borings	6.00 to	6.25
Wrought turnings	6.00 to	6.25
Wrought pipe	7.75 to	8.00

An inquiry is in the market for a small quantity of carwheels for export. Foundries continue to purchase small lots of cast scrap with an occasional transaction as large as 100 tons. Quotations to consumers on cast scrap are as follows, per gross ton, New York:

Carwheels	$8.75 to	$9.00
No. 1 heavy cast, broken up	11.00 to	11.25
Stove plate	8.00 to	8.25
Locomotive grate bars	7.50 to	8.00
Malleable cast (railroad)	8.00 to	8.25

Buffalo

BUFFALO, N. Y., April 13, 1915.

Pig Iron.—Only a small percentage of the large inquiries mentioned in last week's report have materialized into orders. Producers claim that prices are being firmly held at the advance recently established. The minimum is now $13 at furnace on the lower grades for second and third quarter delivery, ranging up to $13.25 to $13.50 at furnace for No. 1 foundry, some of the special higher silicon irons commanding $13.75. A notable improvement is apparent in the foundry melt of the district as well as in general foundry activity. Shipments on contracts are going forward from furnaces in good volume, and some foundries which have been operating on a limited schedule for the past few months are now doubling their specifications. Another gratifying feature is the improvement noted in the sale of specialties in charcoal and high silicon irons. We are still unable to quote a definite graduated schedule of prices for the different grades of foundry irons.

Finished Iron and Steel.—While the mills and sales agencies of this district are quoting 1.20c., Pittsburgh base, for steel bars, plates and shapes, for immediate specification or for shipment at mill's convenience, there is apparently no endeavor being made by sellers to negotiate for future business. The demand for bars is in fair volume, quite a liberal proportion being for export. Steel mills here are operating at 72 to 75 per cent. of capacity. Agencies handling wire products report a very active demand, the business almost swamping some mills. One of the independent large producers is now operating at full capacity, with deliveries approximately 30 days behind; a considerable portion of present bookings are for export. Bids are to be opened to-morrow for structural steel for the new Buffalo Terminal of the Lehigh Valley Railroad, including passenger and freight stations and elevated approach.

Old Material.—The market is active. The demand for heavy melting steel has increased, but dealers are finding it difficult to obtain any better prices than $10.50

to $11. The demand has also increased for busheling scrap and a fair amount of business has been done in turnings and borings. Prices for the last two commodities are slightly easier, but without sufficient variation to make a quotable difference in the schedule given in the last two weekly reports. Dealers entertain the opinion that the increased demand noticeable for many commodities means a higher level of prices in the near future.

Boston

BOSTON, MASS., April 13, 1915.

Old Material.—The market is a little weaker, if anything, but the change is slight. The steel interests have probably taken care of their demands for the immediate future. The quotations given below are based on prices offered by the large dealers to the producers and to the small dalers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. Mill prices are approximately 50c. per ton higher.

Heavy melting steel	$8.25 to $8.50
Low phosphorus steel	13.75 to 14.75
Old steel axles	12.75 to 13.25
Old iron axles	20.25 to 20.75
Mixed shafting	12.00 to 12.25
No. 1 steel wrought and soft steel	8.25 to 8.75
Skeleton (bundled)	5.50 to 5.75
Wrought-iron pipe	7.00 to 7.50
Cotton ties (bundled)	5.25 to 5.75
No. 2 light	3.25 to 3.75
Wrought turnings	5.00 to 5.50
Cast borings	5.00 to 5.25
Malleable	7.50 to 7.75
Stove plate	7.00 to 7.50
Grate bars	5.25 to 5.50
Machinery cast (price to consumers)	11.25 to 11.50

British Market Feverish

Prices Still Advancing—Output Falling—Works Monopolized on Goverment Orders

(*By Cable*)

LONDON, ENGLAND, April 14, 1915.

Markets are feverish but pointing upward. Business is within narrow limits and output is falling with the difficulties in getting fuel. Furnaces in blast are 165, against 169 a year ago. Stocks of pig iron in Connal's stores were 132,700 tons at the close of last week, against 128,181 tons one week previous. Semi-finished steel is firm and Welsh sheet bars have sold mostly at 145s. ($35.28), but quoted up to 150s. ($36.50). American billets have been done at 135s. ($32.85), c.i.f. Liverpool, and buyers' demands for merchant steel are difficult to meet because works are largely monopolized on government orders.

Scottish steel masters are taking a census of all spare plants suitable for the production of war munitions. Private work is being displaced in all directions by Government needs, particularly in shipyards where the merchant tonnage building is 340,000 less than a year ago. Tin plates are strong, with record shipments since the war. American furnaces recently sold 5000 tons of hematite (Bessemer) iron to Italy. Shippers are now in difficulty regarding freight and 40s. ($9.73) is talked of. Quotations are as follows:

Tin plates, coke 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 17s. ($4.14) against 16s. 9d. ($4.07) last week.

Cleveland pig-iron warrants, 66s. 10½d. ($16.27) compared with 68s. 11d. ($16.77) last week.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 66s. 9d. ($16.24) against 69s. ($16.79) a week ago.

Steel black sheets, No. 28, export, f.o.b. Liverpool, £10 15s. ($52.31) against £10 10s. ($51.09) a week ago.

Steel ship plates, Scotch, delivered local yards, £9, 15s. ($47.44) compared with £9 10s. ($46.22) a week ago.

Steel rails, export, f.o.b. works port, £7 15s. ($37.71) against £7 10s. ($36.50) a week ago.

Hematite pig iron, f.o.b. Tees, 105s. ($25.55).

Sheet bars (Welsh), delivered at works in Swansea Valley, £7 ($34.06).

Steel joists, 15 in., export, f.o.b. Hull or Grimsby, £9 5s. ($45.01) against £9 ($43.79) last week.

Steel bars, export, f.o.b. Clyde, £9 17s. 6d. ($48.05) against £9 10s. ($46.22) a week ago.

Ferromanganese, f.o.b., $15 10s. ($75.42).

Metal Market

NEW YORK, April 14, 1915.

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Spelter	
Apr.	Lake	Electrolytic	Tin, New York	New York	St. Louis	New York	St. Louis
7	17.25	15.87½	48.50	4.20	4.12½	9.75	9.60
8	17.25	16.00	54.00	4.20	4.12½	9.75	9.60
9	17.25	16.12½	58.00	4.20	4.12½	9.75	9.60
10	17.25	16.12½	.....	4.20	4.12½	9.87½	9.75
12	17.50	16.25	57.50	4.20	4.12½	9.87½	9.75
13	17.75	16.37½	57.00	4.20	4.12½	9.87½	9.75

Copper has been in good demand and is higher. Tin has advanced because of the greater scarcity in spot metal. Lead has an easier tone. Spelter is higher. Antimony is unchanged with English brands entirely nominal.

New York

Copper.—Large sales of Lake and electrolytic on both foreign and domestic account took place April 7. Electrolytic sold on the basis of 16c., delivered in the Naugatuck Valley, 30 days. The good demand caused prices to stiffen. On April 12 there were further good sales of electrolytic at 16.25c., cash, New York, and 16.37½c. and ⅛c. higher on delivered terms. Lake went to 17.25c., then to 17.50c., where it was firmly held. Exports so far this month total only 2823 tons, but a great deal of copper has been exported in the form of brass and finished products. The total exports in March were 30,148 tons. From January 1 to April 1 71,924 tons has been sent abroad against 117,156 tons in the same period of last year. The American Brass Company has advanced its base price of hot rolled sheet copper to 21.25c. per lb. The quotation for Lake, yesterday, was 17.75c., cash, New York, and for electrolytic, 16.37½c., cash, New York.

Tin.—The market is much upset because of the extreme restrictions and exactions imposed by Great Britain on practically all business in tin. Dealers receiving tin from British ports are obliged to sign a statement which prohibits them from reselling to dealers and compels them to state precisely to whom they sell, and stipulates that, whether the tin is imported from England or not, it shall not be re-exported to any other country not included in British dominion. Appended to the statement must be another from the consumer in which the latter guarantees that he will use the metal solely for his own manufacturing purposes and that he will not ship any tin during the period of the war, except to British possessions. It is feared that this will have the effect of suppressing business between dealers, and between dealers and retailers. Roughly, the latter take about 20 to 25 per cent. of the tin imported. The British Government also stipulates that metal arriving on consignment, or arriving unsold, cannot be delivered until satisfactory assurances have been given as to its ultimate destination. Meanwhile, the firm of J. P. Morgan & Co. is to hold the metal and for its services will receive ¼ of 1 per cent. of the value of importation. The quantity of spot available is small and held by only a few hands. Sales have been few. Never before has such a scarcity been known to exist. In the last 10 days of this month several steamers are due from the Far East, all of which will be slow in discharging, but which will probably bring some relief to the situation by May 1. The arrivals this month total but 305 tons and the amount estimated afloat is 5195 tons. The quotation yesterday in New York was 57c.

Lead.—The market was firm up to Monday, when London weakened considerably and caused uncertainty here. A strong market became a heavy one. The demand from abroad continues large though not so heavy as it has been. Up to yesterday 2049 tons has been exported this month, a portion of it from Southern ports. The domestic demand continues disappointingly light. The quotations yesterday were 4.20c., New York, and 4.12½c., St. Louis.

Spelter.—The market has grown steadily in strength in the past two days. The quotations yesterday were about 9.87½c., New York, and 9.75c., St. Louis, for

prime Western. A good part of the demand is for the higher grades, some of which are unobtainable even though quoted at 20c. Deliveries can only be guaranteed a long way ahead. For the first time in the memory of the trade spelter has sold at prices higher than those for copper. A good bit of inquiry is reported but sellers are lacking.

Antimony.—Chinese antimony is quoted at 21c. to 22c. English brands, such as Cookson's and Hallett's, are nominal, the former at 35c. and the latter at 32c.

Old Metals.—The market is active at advancing prices. Dealers' selling quotations are as follows:

	Cents
Copper, heavy and crucible	15.00 to 15.25
Copper, heavy and wire	14.75 to 15.00
Copper, light and bottoms	13.00 to 13.50
Brass, heavy	9.75 to 10.00
Brass, light	7.75 to 8.00
Heavy machine composition	12.00 to 12.50
No. 1 yellow rod brass turnings	9.75 to 10.00
No. 1 red brass or composition turnings	10.00 to 10.50
Lead, heavy	3.75
Lead, tea	3.50
Zinc, scrap	7.00

Chicago

APRIL 12.—Activity in copper continues well sustained, with further advances in quotations. The temporary slump in tin has been followed by a sharp reaction. In other respects the market presents no price changes of importance. We quote as follows: Casting copper, 15.75c. to 16c.; Lake copper, 16.50c. to 17c., for prompt shipment; small lots, ⅛c. to ¼c. higher; pig tin, carloads, 57c.; small lots, 59c.; lead, desilverized, 4.17½c., and corroding, 4.40c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, nominally, 9.87½c. to 10c.; sheet zinc, 13.50c., price for immediate acceptance; Cookson's antimony, 30c., for cask lots; other grades, 23c. to 24c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 12.25c.; copper bottoms, 10.75c.; copper clips, 12c.; red brass, 10.75c.; yellow brass, 8.75c.; lead pipe, 3.50c.; zinc, 7.25c.; pewter, No. 1, 29c.; tinfoil, 35c.; block tin pipe, 42c.

St. Louis

APRIL 12.—Non-ferrous metal prices generally are higher. Lead is quoted at 4.30c.; spelter, 10.25c.; tin, 58.50c.; Lake copper, 17.50c.; electrolytic copper, 17.35c.; Cookson's antimony, 32c. In the Joplin ore market zinc blende was somewhat stronger. The basis range was $52 to $60 for 60 per cent., with the top settlement as high as $63. Calamine brought $31 to $34, with premium ores as high as $39. Galena sold at $51 for 80 per cent. lead. Miscellaneous scrap metals are quoted as follows: Light brass, 5.75c.; heavy yellow brass, 7c.; heavy red brass and light copper, 9c.; heavy copper and copper wire, 10.50c.; zinc, 4c.; lead, 3.50c.; pewter, 23c.; tinfoil, 33c.; tea lead, 3.50c.

Soo Canal Traffic in 1914

The statistical report of lake commerce passing through the canals at Sault Ste. Marie, Michigan and Ontario, in the season of 1914, has just been issued. It shows that the total freight traffic through the American and Canadian canals was 55,369,934 net tons, a decrease of 24,348,410 tons, or 31 per cent., from the total for 1913. A map and half-tone views indicate what is being done to increase locking capacity at the Sault. The third lock on the American side was opened October 21, 1914. Views of the new or fourth lock show that good progress has been made with excavation, the last view having been taken October 15, 1914. The new third lock is 1350 ft. long and 80 ft. wide and has 24½ ft. of water upon its miter sills at existing stages. The work was under way from 1908 to 1914.

American purchases of merchandise from Great Britain increased from $160,046,770 in 1904 to $283,209,085 in 1914, a gain of $123,162,315, or 43.5 per cent. From France the increase was from $79,969,469 in 1904 to $102,532,104 in 1914, or $22,562,635—22 per cent. From Germany the increase was $51,130,525, or 32.7 per cent., rising from $105,646,279 in 1904 to $156,776,804 in 1914.

Iron and Industrial Stocks

NEW YORK, April 14, 1915.

The upward movement in stocks became almost cyclonic on two or three days of the past week. Prices were advanced much above previous levels, and some stocks, notably Bethlehem Steel common, far exceeded all previous records. While manipulation by shrewd operators may have been instrumental in the advances on some stocks, the upward movement was too general to be ascribed wholly to influences of this character and the presumption has become strong that the public is again taking a deep interest in stock speculation. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com..	14	-	15
Allis-Chal., pref..	43	-	55
Am. Can, com...	31	-	36½
Am. Can, pref...	95½	-	99
Am. Car & Fdy., com.	48	-	50½
Am. Car & Fdy., pref.	113		113½
Am. Loco., com..	30¼	-	35⅞
Am. Loco., pref..	89	-	92
Am. Steel Fdries.	30⅜	-	33
Bald. Loco., com.	37⅞	-	40⅛
Bald. Loco., pref.	99	-	100
Beth. Steel, com.	85⅛	-	155
Beth. Steel, pref.	106	-	113
Case (J. I.), pref.			80
Colorado Fuel...	29¼	-	33¼
Deere & Co., pref.	86	-	87
General Electric.	147	-	151¼
Gt. No. Ore Cert.	34½	-	41⅜
Int. Harv. of N. J., com.	97	-	103
Int. Harv. of N. J., pref.			114
Int. Harv. Corp., com.	72½	-	80
Int. Harv. Corp., pref.	100	-	100½
Int. Pump, com..	1½	-	2
Int. Pump, pref..	6½	-	10
Lackawanna Stl.	34	-	39
Nat. En. & St., com.	12½	-	16⅜
Nat. En. & St., pref.			80
Pressed St'l, com.	33½	-	35⅝
Pressed St'l, pref.			97
Ry. Spring, com.	24¾	-	27
Ry. Spring, pref.	86½	-	87
Republic, com...	23⅞	-	27½
Republic, pref...	81	-	85
Rumely Co., com.	2⅞	-	5¼
Rumely Co., pref.	8	-	14
Sloss, com.	31	-	37
Pipe, com.	10	-	12½
Pipe, pref.	40	-	45
U. S. Steel, com..	49½	-	58
U. S. Steel, pref..	106⅛	-	109½
Va. I. C. & Coke.	42	-	45
West'gh'se Elec..	74	-	79
Am. Ship, com.			26
Am. Ship, pref.			67½
Chic., Pneu. Tool	53	-	58½
Cambria Steel...	45½	-	48¾
Lake Sup. Corp..	5	-	6
Pa. Steel, pref...	60	-	61
Warwick	9½	-	9⅝
Cruc. Stl., com..	14⅝	-	16¾
Cruc. Steel, pref.	80	-	84
Harb.-Walk. Ref., pref.	98	-	99
La Belle Iron, com.	28¼	-	29½

The week has also witnessed unusual activity and strength in securities of companies now receiving large war orders. Common stock of the E. W. Bliss Company, which sold at $211 April 7, has since sold at $330, with quotations now $325 bid and $350 asked.

Installation of Large Multiple Water Strainers

The Duquesne Light Company, Pittsburgh, Pa., has added three 30-in. multiple water strainers to its present equipment. There are now eight of these strainers, made by the Lagonda Mfg. Company, Springfield, Ohio. As illustrated in *The Iron Age*, October 31, 1912, each strainer has five baskets, four of which are always in service. With all of the baskets in use, an effective straining area of over 3-1/3 times that of the pipe line in which the strainer is installed is said to be secured, while with one basket held in reserve or removed for cleaning, the straining area of the four is over 2½ times the pipe section. Operating the handwheel raises the basket into the cleaning chamber, and the cover is then removed by loosening three bolts, after which the basket is lifted out in a vertical position for cleaning.

Corrigan, McKinney & Co., Cleveland, Ohio, have placed an order with the Westinghouse Machine Company, Pittsburgh, for three condensers for the main power plant that is being erected in connection with their new steel plant. Two of the condensers are for 7500-kw steam turbines and the third is for a 2500-kw steam turbine.

Germany's exports to the United States in 1914 amounted to $156,776,804 as compared with $186,035,254 in 1913, a decrease of 15.7 per cent. As affected by the war, the exports in the last six months of 1914 were $62,149.173 contrasted with $100,686,625 for the same period in 1913, a decrease of $38,537,452 or over 38 per cent.

Tin exports from Bolivia in 1914 are estimated at 34,624 metric tons. To August 1 they were 24.533 tons, or 3505 tons per month. For the five months of the war period they were 10,091 tons, or 2018 tons per month, a falling off of 36 per cent.

Germany's 1914 Steel Output and the War

The recent publication by Stahl und Eisen of the official figures of the Vereins Deutscher Eisen und Stahl Industrieller shows the December production of steel to have been 941,399 metric tons. This is the largest monthly output since the war began, the tonnages for the other months of the war being August 566,822 tons, September 663,223 tons, October 900,201 tons, and November 900,026 tons. The total for 1914 is 14,973,106 metric tons, comparing with 18,958,819 tons in 1913, the record year, a falling off of about 21 per cent. An analysis of these figures shows that up to the outbreak of the war the steel output of Germany was a little over 1,570,000 tons per month. With each month of the war's progress there has been an increase, with the exception of November, until it is now over 900,000 tons per month or 56.25 per cent. of the average for the year and a half preceding the war. Comparing the various grades of steel, the following table shows the output for 1913 and 1914 in metric tons:

	1913	1914
Ingots	18,394,975	14,490,336
Castings	362,916	298,338
Total acid steel	535,293	462,181
Total basic steel	18,222,598	14,326,493
Crucible steel	99,173	95,096
Electric steel	101,755	89,336
Total	18,958,819	14,973,106

Ten years ago, 1904, steel production was 8,930,291 tons, and five years ago it was 12,049,834 tons.

An analysis of the pig-iron data published in *The Iron Age*, February 18, shows a striking similarity to the steel statistics. The totals for 1913 and 1914 were 19,309,172 and 14,389,347 metric tons respectively, a decline of about 26 per cent. Up to the war the average monthly output was 1,550,120 tons. The output with each month of the war's progress has increased, with a slight recession in September, until it is now more than 850,000 tons per month, or 55 per cent. of the normal average. The general similarity in the total and average production of pig iron with the corresponding figures for steel is noticeable for both the periods before and during the war, and the progressive improvement in each case since the beginning of the war is striking.

The Southern Pig-Iron Freight Rate Case

WASHINGTON, D. C., April 13, 1915.—The Interstate Commerce Commission, after an interval of five months from the date of the re-opening of the case of the Sloss-Sheffield Steel & Iron Company, et al., vs. the Louisville & Nashville Railroad Company, et al., involving the rates on Southern pig iron to all parts of the country, has fixed May 3 as the date when the case will be heard in this city. No less than 350 railroad systems are named as defendants in the case and the hearing is expected to consume several days.

The scope of the investigation has been extended "so as to include the admission of evidence upon and the reconsideration of the reasonableness of rates for the transportation of pig iron in carloads from points of origin to Boston, Mass., by rail and water, to Springfield and Lowell, Mass., and Portland, Me., by rail, water and rail, and to other New England points covered by the commission's order of June 1, 1914; provided, however, that pending such investigation the said order of June 1, 1914, shall remain in full force and effect."

W. L. C.

Lake Superior Iron Ores for 1915

The Lake Superior Iron Ore Association has issued its book containing average cargo analyses of Lake Superior ores shipped in the season 1914. An interesting feature is the large number of changes made in the ore list of a year ago. Of the ores listed in last year's book 47 are missing this year, and 37 additions are made. Of the latter 22 have never been listed before and 15 were in lists previous to last year. The number of ores is eight less than a year ago, the total this year being 288, as compared with 296. Among ores that have not appeared in any previous analysis books of the association are the Armour No. 1 and No. 2 and Armour Manganese and Kennedy, all of which are Rogers, Brown & Co. ores from the Cuyuna range. The Crow Wing ore from this range, listed for the first time a year ago, appears this year under four classifications—Crow Wing A, B, C and D, the basis of grading being the amount of manganese contained, ranging from 23.02 per cent. to 10.07 per cent. The association will shortly complete the preparation of data showing the average iron content of the various ores listed, as compared with previous years.

Swedish Iron Trade in 1914

The Swedish Iron Masters' Association report for 1914 shows that in the war period of August to December, 63 to 66 blast furnaces were operating out of a total of 124, and 110 to 134 Lancashire hearths out of 260. At the year's end only 45 of 75 open-hearth steel furnaces were operating, and of the 24 Bessemer converters only 6. Pig-iron production in 1914 was 635,100 tons or 95,200 less than in 1913, the August-December period accounting for 68,000 tons of this decline. The total output of puddled iron blooms and steel ingots was 613,900 tons or 129,800 tons less than in 1913, the five war months causing 103,600 tons of this decrease.

Total exports of iron and steel were 383,000 tons in 1914 against 502,600 tons in 1913, a falling off of 119,600 tons, of which 84,000 tons was in the last five months. Exports of iron ore were 1,759,000 less in 1914 than in 1913. Pig-iron imports increased 8600 tons over 1913, the total for 1914 being 103,200 tons.

Austria's Steel Output in 1914

Austria-Hungary's production of all grades of steel in 1914, according to data by F. Schuster of Witkowitz, Austria, published in Stahl und Eisen, was 2,190,759 metric tons against 2,682,619 tons in 1913, a decrease of 491,860 tons or 18.34 per cent. The 1914 total was made up of 4613 tons of acid Bessemer, 159,500 tons of basic Bessemer, 1,948,869 tons of open-hearth steel ingots and castings (or 14.67 per cent. less than in 1913); 40,376 tons of puddled iron and steel; 17,557 tons of crucible steel and 19,844 tons of electric steel. The falling off in acid Bessemer steel production in 1914 was 89.17 per cent. from that of 1913, all made in Hungary. The output of rails was 191,387 tons in 1914 compared with 255,697 tons in 1913, a falling off of 64,310 tons or 25.72 per cent. The production is about equally distributed between Austria and Hungary.

The American Supply and Machinery Manufacturers' Association announces that one of the features of the joint convention to be held with the National Supply and Machinery Dealers' Association at Philadelphia, June 3 and 4, will be an address by C. M. Ripley, electrical engineer, who is also a student of the comparative values of methods of producing and supplying power. In connection with this address a blank is being sent to the members of the association for the purpose of compiling statistics relative to their total cost of heat, light and power. Information will thus be exchanged among the members on some common basis of comparison.

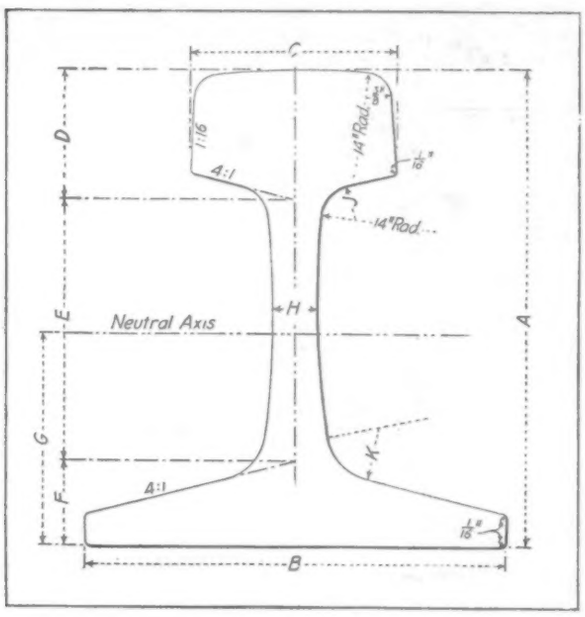
The Bristol Company, recording instruments, Waterbury, Conn., announces that its Pittsburgh branch office has been moved from 1670 Frick Annex into better quarters at 832 Frick Building. R. B. Anthony is Pittsburgh district manager.

The Chicago Pneumatic Tool Company, Chicago, Ill., announces the removal of its New York office from 50 Church street to 52 Vanderbilt avenue, and of its Boston office from 191 High street to 185 Pleasant avenue.

The furnace of the Belfont Iron Works Company, Ironton, Ohio, which was blown out April 6, will remain idle indefinitely. Meanwhile necessary repairs will be made.

New Rail Sections

The recent convention of the American Railway Engineering Association at Chicago adopted three new rail sections for 100-lb., 110-lb. and 120-lb. rails. Also, without however recommending their adoption, the rail committee submitted 130-lb. and 140-lb. sections. The 90-lb. A-section of the American Railway Association was also approved in the shape recommended by the committee. The illustration and the table below give the dimensions of these six various sections. In *The Iron Age* of March 11, a description and drawing was published of the 100-lb. and 125-lb. rail of the Pennsylvania Railroad and in the issue of March 25, the 135-lb. rail of the Central Railroad of New Jersey was given.



Dimensions of Standard Rail Sections

Weight, lb. per yd...	90		100		110		120		130		140	
Distances, in.												
A	5 5/8		6		6 1/4		6 1/2		6 3/4		7	
B	5 1/8		5 3/8		5 1/2		5 3/4		6		6 1/4	
C	2 9/16		2 11/16		2 25/32		2 7/8		2 15/16		3	
D	1 15/32		1 21/32		1 23/32		1 25/32		1 27/32		1 29/32	
E	3 5/32		3 9/32		3 13/32		3 17/32		3 11/16		3 27/32	
F	1		1 1/16		1 1/8		1 3/16		1 7/32		1 1/4	
G	2 35/64		2 3/4		2 53/64		2 59/64		3 1/32		3 9/64	
H	9/16		9/16		19/32		5/8		21/32		11/16	
J	3/4		3/4		3/4		3/4		1/2		1/2	
K	7/8		7/8		7/8		7/8		3/4		7/8	
Areas:	sq. in.	per cent.	sq. in.	per cent.	sq. in.	per cent.	sq. in.	per cent.	sq. in.	per cent.	sq. in.	per cent.
Head	3.20	36.2	3.80	38.2	4.04	37.4	4.40	37.1	4.63	36.4	4.93	36.3
Web	2.12	24.0	2.25	22.6	2.49	23.0	2.69	22.7	3.02	23.8	3.28	24.1
Base	3.50	39.8	3.90	39.2	4.29	39.6	4.76	40.2	5.06	39.8	5.37	39.6
Total	8.82	100.0	9.95	100.0	10.82	100.0	11.85	100.0	12.71	100.0	13.58	100.0
Moment of inertia	38.7		49.0		57.0		67.6		77.4		89.2	
Section modulus, head	12.56		15.1		16.7		18.9		20.8		23.1	
Section modulus, base	15.23		17.8		20.1		23.1		25.6		28.4	
Ratio M. I. to area	4.39		4.92		5.27		5.71		6.09		6.56	
Ratio sec. mod. to area	1.42		1.52		1.55		1.59		1.64		1.70	
Exact weight, lb. per yd.	89.96		101.49		110.36		120.87		129.64		138.52	

Thomas Iron Company's Output for 61 Years

The 61st anniversary of the incorporation of the Thomas Iron Company, Easton, Pa., fell on April 4. No doubt the company is entitled to be known as the oldest engaged in pig-iron manufacture in the country, that is still working under its original corporate name. In its 61 years the Thomas Iron Company has made 6,245,312 tons of merchant pig iron and has put on the market all of this excepting 5140 tons. In these years the company has paid to the stockholders in dividends $9,386,112, of which $6,964,541.26 came from the profits of pig-iron manufacture. The rgrettable feature of so long and creditable a record is that business conditions in the United States in the past few years have been such as to cause the suspension of dividends by the directors of the company.

Oil Firing in Foundry Practice

W. N. Best, New York, in an address before the Newark Foundrymen's Association, Newark, N. J., April 7, explained the use of oil as fuel in mold and core-drying ovens and in brass foundry practice. In part, he said:

Oil, the fuel of the twentieth century, can be burned very economically or very wastefully. To obtain the highest efficiency and strictest economy, it must be burned scientifically: 1. The oil must be thoroughly atomized by a burner which is capable of atomizing any gravity of liquid fuel purchaseable in the open market. The burner must not carbonize and it should deliver a flame of the form and proportions required. 2. The pressure of the steam or air used for atomization must be as constant as it is possible to make it. 3. The oil must be delivered to the burner at an unvarying pressure. 4. To obtain the desired results it is also important that the air used to support combustion, which is usually supplied at low pressure, say 3 oz., be delivered without variation. 5. A combustion chamber of adequate proportions must be used so that the air required for combustion can unite with the consuming fuel before it reaches the furnace proper. 6. The furnace must be of modern design and construction, carefully built, and properly vented so that the consumed and inert gases from the atomized fuel will be expelled efficiently.

FEATURES OF MOLD-DRYING OVEN

Mr. Best described an oven 12 ft. in hight, 20 ft. in width and 44 ft. in length, used in drying large molds in steel foundries, as follows: It is of the double-track type and holds six cars. A long combustion chamber extends centrally and longitudinally through the oven. This chamber is made of standard firebrick and slabs and is simple in construction. From the long combustion chamber the heat passes into the oven through openings of graduated size in the top of the chamber and on a line with the floor of the oven. As the atomized fuel and the air which supports combustion are delivered at one end of the combustion chamber, the proper graduation of the holes or openings is a necessary feature in order to secure an even heat along the entire base of the oven. Only one burner is used. More than one makes the operation complex and even temperatures an impossibility.

PRACTICAL SUGGESTIONS

A stack should not be used on a mold-drying oven, but vents should be provided in the arch or roof of the oven through which the moisture from the molds and the consumed and inert gases can pass.

Always use a heat-recording instrument and have the record of each oven on the superintendent's desk every morning. You will never get economy nor the highest efficiency until this is done. I know of one firm, which has 12 mold-drying ovens, that saves 1000 gal. of oil a month by the use of these instruments. We should not guess at temperatures. There is no

necessity for heating an oven above 600 deg. F. for drying molds and none for heating it less than that.

For core ovens of the car type, the oil equipment is the same as that of the mold-drying oven above described, but the long combustion chamber with its graduated heat ports is proportionately smaller.

In applying oil equipment to a number of small ovens, a battery of six ovens, approximately 4 ft. x 4 ft. in size, can be operated with one combustion chamber and one burner.

MODERN BRASS MELTING

A number of years ago many brass manufacturers considered the direct-fired furnace to be the most economical to operate, and this type was very popular until metallurgists discovered that while it was less costly in fuel to melt brass in a direct-fired furnace, the waste of the metal was excessive. This was especially true with those alloys which fuse at low temperatures. They were consumed before the copper became sufficiently molten, which resulted in a change in the composition of the metal as poured into castings. One can readily see that when specifications for the brass are within one-half of one per cent. the results obtained from a direct-fired furnace may be disappointing. The crucible furnace is the only type with which I am acquainted that insures specific analyses in brass castings.

A modern six-pot brass melting furnace, known as the reversible type, operates as follows: The six pots are filled with metal and charged into the furnace. One burner is operated until the metal in the three pots in the compartment next to the burner (which at that time is the melting zone of the furnace) is melted and drawn. After these crucibles are recharged this burner is shut off and a burner on the opposite end of the furnace is operated, making that end of the furnace the melting zone and the other end the preheating zone. By this method we get the full benefit of the waste gases passing through the melting zone into the preheating zone and out through the stack. Of course, the pots in the melting zone can receive additional copper or alloys when necessity demands. The two-ton bull ladles used with the air furnace should be heated to the temperature of the metal about to be poured into them.

American Iron and Steel Institute

On April 29 the offices of the American Iron and Steel Institute will be removed from the Hudson Terminal Building, 30 Church street, where they have been for the last five years, to the twenty-ninth floor of the new Adams Express Company Building, 61 Broadway, New York.

Among the papers thus far selected for the eighth general meeting at the Waldorf-Astoria, New York, on May 28, are the following:

"Blast Furnace Advancement," by Andrew E. Maccoun, superintendent Edgar Thomson blast furnaces, Carnegie Steel Company, Braddock, Pa.

"Modern Merchant Steel Mills," by Jerome R. George, chief engineer Morgan Construction Company, Worcester, Mass.

"Corrosion of Steel," by Daniel M. Buck, chemist and metallurgist American Sheet & Tin Plate Company, McKeesport, Pa.

At the banquet in the evening the principal address will be one describing and illustrating the welfare work of the Tennessee Coal, Iron & Railroad Company by Dr. Lloyd Noland, superintendent of the health department of that company. One or two additional papers will be determined upon in the near future, but the list of papers is intended to be shorter at this meeting than heretofore, while open informal discussion under the five minute rule will be encouraged.

Fires were lighted in 500 coke ovens at Ellsworth and Cokeburg, Pa., on April 10, when the local plants of the Lackawanna Steel Company were put in active operation, giving employment to about 2200 men. These plants have been either shut down or running only on part time for more than a year.

Vessel Changes Under Seamen's Act Deferred

WASHINGTON, D. C., April 13, 1915.—Great confusion has been created among shipbuilders and shipowners by conflicting announcements on the part of several of the executive departments here concerning the taking effect of the act of March 4, 1915, commonly known as the merchant marine seamen's act, which was rushed through Congress in its last hours. The Secretary of Commerce forwarded to collectors of customs a letter instructing them to notify all shipbuilders that section 6 of the new law, which relates particularly to structural changes in vessels, to provide more room for seamen for lodgings and other purposes, would be held to apply to all vessels the keels of which were laid after March 4, 1915. This instruction was in line with the language of the section, making it applicable to "all merchant vessels of the United States the construction of which shall be begun after the passage of this act." There were also provisions for an extraordinary equipment of lifeboats, life rafts, etc. In these and other particulars the law operated to nullify the specifications under numerous contracts entered into by shipbuilders prior to March 4. Attorneys were called upon to examine the text and the Government's attention was drawn to the fact that paragraph 18 contained the following provision wholly at variance with that contained in section 6:

> Sec. 18. That this act shall take effect, as to all vessels of the United States, eight months after its passage, and as to foreign vessels twelve months after its passage, except that such parts hereof as are in conflict with articles of any treaty or convention with any foreign nation shall take effect as regards the vessels of such foreign nation on the expiration of the period fixed in the notice of abrogation of the said articles as provided in section 16 of this act.

The Attorney General has rendered an elaborate opinion in which he holds that the provisions of section 6 with respect to the taking effect of the law must be ignored in view of the very specific terms of section 18. Collectors of customs will, therefore, be instructed to inform shipbuilders that neither section 6 nor any other provision of the new law will apply to vessels the keels of which are laid before November 4 next. The same date will govern the application of the lifeboat and liferaft provisions of section 14. Those provisions of the law which apply to foreign vessels will be held to become effective on March 4, 1916, except where treaties require a year's notice.

In view of the extraordinary provisions of the seamen's act, which is commonly regarded as dealing a death blow to the remnant of the American merchant marine in the foreign trade, in addition to demoralizing the coastwise branch of the service, it is not surprising that rumors should be current that plans are being made by Congressional leaders to repeal the statute early in the next Congress. So far as can be learned there is absolutely no basis for these reports. The bill was passed upon the demand of the seamen's unions, affiliated with the American Federation of Labor, and there is no reason to believe that this influence will be less potent in the coming Congress than in the one just ended. W. L. C.

To Make Low-Phosphorus Pig Iron

The Thomas Furnace Company, Milwaukee, plans to blow in its blast furnace early in May, for a run on low-phosphorus iron. Orders for such iron aggregating a round tonnage have been accumulated. This will be the only furnace in the West making standard low-phosphorus iron for the merchant trade. The ore for this product is taken from the old Indiana mine located west of Iron Mountain, Mich., on the Menominee range. Later the stack will revert to malleable iron.

The steam boiler specifications furnished by the London Guarantee & Accident Company, Ltd., Chicago, will, according to a letter received by Thomas E. Durban, general manager Erie City Iron Works, from J. F. Sturgis, superintendent of the boiler department of the insurance company, conform to the standard specifications of the American Society of Mechanical Engineers.

National Metal Trades Meeting

The National Metal Trades Association is holding its seventeenth annual meeting at the Hotel Astor, New York. The first session was opened Wednesday morning. At this writing an active discussion is taking place over the apprenticeship question, following a report of the association's apprenticeship committee, W. A. Viall, Brown & Sharpe Mfg. Company, chairman. The report recommended that the association appoint 3 members as its representatives on a national conference board on training apprentices, paying for membership on the board and meeting the members' expenses in attending the board's meetings.

H. N. Covell, Lidgerwood Mfg. Company, president of the New York and New Jersey branch, made a happy speech of welcome and the officers then made their reports.

Herbert H. Rice, Waverley Company, Indianapolis, in his presidential address, emphasized the need of oversight that there is a freedom of strikes after the readjustment bound to take place after the cessation of hostilities in Europe. He referred to the past year as not uneventful in the matter of labor legislation and expressed hope of a good influence being exercised over the Federal Commission on Industrial Relations through the participation in the hearings of that commission by members of the association and the representation of the joint committee of the associations having similar objects through Walter Drew. This committee, it will be recalled, includes members from the National Founders' Association and the National Erectors' Association. He made a plea for more members, urging that there are many firms not acquainted with the association or its objects, though the association is fighting their battles. "We need," said he also, "more friends among our men and among the public." He regarded it as specially important and an index of the broad attitude of the association and the openness of its dealings that the office of the commissioner was placed at the disposal of the government investigator as his headquarters in Chicago and that the investigator was allowed to see the correspondence, both incoming and outgoing.

Commissioner John D. Hibbard in his report paid considerable attention to the conferences with and over the Federal Commission on Industrial Relations and felt that one of the year's notable developments has been the closer applications and co-operation through conference boards, which has extended to the formation of a joint committee of associated employers and a conference board on training employees. He referred also to the politically militant associations of employers which have been formed, notably in Missouri and Illinois, as a reflex of the monopoly of organized labor. The commissioner reported few labor difficulties, not more than five being deemed sufficiently important to mention by name. He paid a tribute to the work of William H. Doolittle, the association's safety inspector.

Secretary H. D. Sayre made his report and H. B. Kennedy, Hoggson & Pettis Mfg. Company, New Haven, presented the report of the committee on industrial education. Following Mr. Viall's report on apprenticeship, which was discussed by Theodore O. Vilter, Vilter Mfg. Company, Milwaukee, and Henry D. Sharpe, Brown & Sharpe Mfg. Company, John W. O'Leary, Arthur J. O'Leary & Son Company, Chicago, made a speech for the membership committee.

Officers will be elected at the Thursday morning session. Mr. Rice has been nominated to serve another term. The other nominations are: George Mesta, Mesta Machine Company, Pittsburgh, for first vice-president; W. H. Van Dervoort, the Root & Van Dervoort Engineering Company, East Moline, Ill., for second vice-president, and F. C. Caldwell, H. W. Caldwell & Son Company, Chicago, renominated for treasurer. For councilors for two years, W. A. Layman, Wagner Electric Mfg. Company, St. Louis, Paul B. Kendig, the Seneca Falls Mfg. Company, Seneca Falls, N. Y.; Justus H. Schwacke, Wm. Sellers & Co., Inc., Philadelphia, and Henry D. Sharpe, Brown & Sharpe Mfg. Company, Providence, R. I., have been renominated and the other nominations, six in all to be elected, are J. W. Higgins, Worcester Pressed Steel Company, Worcester, and M. B. McLauthlin, Geo. T. McLauthlin Company, Boston.

George Rahmann & Co.'s Twentieth Anniversary

On April 12, 1895, the business of George Rahmann & Co. was launched, occupying two small lofts and an office at 31 Ferry street, New York. The firm had a comparatively small plant, but plenty of determination. A few years later the entire building at 6 Ferry street was rented, new machinery was installed and the sales force was increased. Again, in October, 1913, the firm moved, but this time into its own building, at 31 Spruce street, which is the present location. The plant is 15 times as large as that of 1896, the second year in business, and with the most up-to-date machinery obtainable either here or abroad for the manufacture of leather belting. The workmen are encouraged to suggest changes, either in the machinery itself or its position on the floor, so that each operation is completed with the least possible loss of time. It is the duty of one man to inspect, repair and advise changes in the factory, in order to reduce the cost of production to a minimum, but without sacrificing the most skilled and expert labor.

While the belting business as a whole was only 65 per cent. of normal last year, the trade of this firm was but 10 per cent. less than 1913, its best year. The keynote of its success has been "quality and service." That this standard has been sustained is shown by the fact that on the firm's books now are some of the same people who were customers its first year in business. To celebrate its twentieth birthday the firm will keep open house all this month.

Electrical Engineers' Meeting in Pittsburgh

The 308th meeting of the American Institute of Electrical Engineers will be held in Pittsburgh on Thursday and Friday, April 15 and 16, and will be under the auspices of the Pittsburgh Section and the Industrial Power Committee. Convention headquarters will be at the Fort Pitt Hotel where the technical sessions will also be held. The programme provides for a paper Thursday morning on "Industrial Control in the Foundry," by R. H. McLain; papers Thursday afternoon on "Mill Controllers," by H. F. Stratton, and "Steel Mill Controllers from the Operator's Standpoint," by James S. Riggs; papers Friday morning on "Control of Direct-Current Hoists in Iron and Steel Mills," by E. G. Stoltz and W. O. Lum, and "Direct-Current Control for Hoisting Equipment in Industrial Plants," by W. T. Snyder; papers Friday afternoon on "Control of Alternating-Current Motors in Iron and Steel Mills," by Arthur Simson, and on "The Alternating-Current Hoist," by Raymond E. Brown.

Philadelphia Foundrymen and Foundry Foremen

The Philadelphia Foundrymen's Association held its monthly meeting at the Manufacturers Club, Philadelphia, Wednesday evening, April 7, and had as its guests the officers and members of the Associated Foundry Foremen of Philadelphia. The usual trade subject for discussion was dispensed with and in its place Joseph S. Hibbs, assistant general manager of the J. W. Paxson Company, Philadelphia, lectured on the resources and development of the Canadian provinces of Manitoba, Saskatchewan, Alberta and British Columbia. Mr. Hibbs, who was formerly employed in Montreal, and has traveled extensively in Canada, presented a most interesting story of the growth of the country, illustrating it with upward of 100 lantern slides.

The Sharp Foundry & Machine Company, New Philadelphia, Ohio, maker of gray-iron castings and mine and clay works equipment, has changed its name to the Sharp Mfg. & Supply Company, and has established a mill, mine and factory supply business in connection with its foundry and machine shop.

Same Rate for Corrugated and Plain Sheets

WASHINGTON, D. C., April 13, 1915.—Carload rates on corrugated galvanized sheets must not exceed the rates on plain black or galvanized sheets of similar gauges, according to a decision handed down by the Interstate Commerce Commission in the cases of the California Corrugated Culvert Company vs. the Alabama Great Southern Railroad Company et al., and the Security Vault & Metal Works and Coast Culvert & Flume Company vs. the Chicago, Burlington & Quincy Railroad Company et al. The principle laid down in this case, it is intimated by the commission, will be extended to other classes of metal products where the difference in value as the result of processing is less than the difference in existing freight rates.

The complainants in this case are engaged in the manufacture and sale of culverts, tanks, flumes, siphons, etc., with principal places of business at Portland, Ore., and West Berkeley and Los Angeles, Cal., and they alleged that the freight rates on corrugated galvanized sheets in carloads from Middletown, Ohio, to the three points mentioned were unreasonable. They also asked reparation covering between 200 and 300 shipments. Charges were collected on these shipments on the basis of the carload rate of 95 cents per 100 lb., whereas the carload rate of 85 cents per 100 lb. was in effect on black or galvanized sheets not corrugated. It was shown that corrugated sheets load as heavily as flat sheets and are of substantially the same bulk, but because of their corrugation pile better in cars and are less likely to scatter. It was contended by the shippers that the two articles are substantially identical from a transportation standpoint. It was shown also that both kinds of sheets are put to the same use; but the carrier insisted that as flat sheets are the raw material the corrugated sheets should take a higher rate.

The commission holds that the 95-cent rate is unjustly discriminatory as compared with the 85-cent rate on flat black or galvanized iron sheets and an order has been issued requiring the defendants to reduce the rate on corrugated sheets to the rate on flat sheets. Considering the 95-cent rate separately from its relation to the 85-cent rate, the commission decides, however, that it is not unreasonable *per se* and, therefore, denies reparation on account of the 300 shipments heretofore made. All future shipments for the period of two years, however, will be entitled to the 85-cent rate. W. L. C.

W. B. Huey and A. H. Huey announce the formation of the Huey Company, with offices and plant located at 59 East Adams street, Chicago. The most approved equipment is now being installed for the production of high grade blue prints, direct blue line prints, negative prints, black line prints, litho reproductions, hectograph copies and photostat reproductions. W. B. Huey was one of the founders and, until recently, was president of the American Blue Print Paper Company, and A. H. Huey was sales manager.

The International Electric Tool Company, Milwaukee, has made improvements recently in its electric pattern vibrator whereby the frequency of vibrations has been increased from 3600 to 7200 per minute. The ease and cleanness with which the pattern can be drawn are appreciably increased. The vibrator has also been arranged to operate on alternating current circuits with a rotary converter instead of a motor-generator set. This company is preparing to manufacture a line of electric riveting and chipping hammers.

The Cincinnati Iron & Steel Company, Cincinnati, Ohio, states that its lathe business continues to be very good. It is receiving not only a number of foreign orders but also a fair proportion of domestic purchases. It is shipping this week a carload of lathes to Canada. On Saturday, April 10, an order was booked for 140 machines of one size.

The Dominion Sheet Metal Company, Ltd., Hamilton, Ont., recently incorporated, is in the market for equipment, among which is an electric crane and crane runways. A. T. Edlow, Box 238, Oshawa, Ont., is president.

Calculating Machine Company Expanding

At a recent meeting of the stockholders of the Monroe Calculating Machine Company, Woolworth Building, New York, it was decided to increase the capital stock from $300,000 to $600,000, to take care more rapidly of the great increase in demand for its time and labor saving device. The company has been manufacturing for a little over two years a machine which performs rapidly, without mental effort on the part of the operator, the four operations of arithmetic —multiplication, division, addition and subtraction. This machine has been introduced into the offices of many large corporations and has become so favorably known that the sales for March exceeded by more than 100 per cent. that of any previous month. In spite of adverse business conditions the company is buying additional machinery and arranging to double the output of its factory at Orange, N. J. Sales offices have been opened in 14 important cities and more will be added as rapidly as possible. There has also been a large export demand for the machine which the company has not been able to fill, but it now expects to be in position to handle more of this business.

Studebaker Corporation's Annual Report

The Studebaker Corporation's report, covering operations for the year ended December 31, 1914, states that the net sales aggregated $43,444,223; total net earnings were $5,345,395; after deductions for interest and extraordinary expenses the net profit was $4,441,966. The net profits in 1913 were $1,772,473, the increase in profits in 1914 therefore being over 150 per cent. The regular dividend on the preferred stock was paid in 1914, but no distribution was made on the common stock. While the sales for 1914 were the largest in the history of the company, the volume of business suffered considerable curtailment in the latter part of the year because of the European war. Shipments of automobiles in 1914 were 36,430, against 32,504 in 1913. Vehicle sales were 7.6 per cent. below those of 1913. Current liabilities were reduced $4,168,978 during the year, including $3,950,000 notes retired. The report states that large plant expenditure will not be necessary for some time, as present plants and equipment have sufficient capacity for a much greater output.

American Manganese Mfg. Company

The Dunbar furnace of the American Manganese Mfg. Company, Dunbar, Pa., which has been running on high manganese foundry iron will be put on 80 per cent. ferromanganese in May or June. It is planned to use a mixture of Brazilian and Cuyuna manganese ores, but the run will be limited to the available supply of Brazilian ore. The latter is difficult to get because of the high freight rate now prevailing. The highest ferromanganese so far made by the company has been 44 and 45 per cent. It has made, also, a foundry iron which runs remarkably low in sulphur. Analyses of the iron shipped in 12 cars out of 29 cars recently showed no sulphur whatever, while the remainder showed an average of only 0.009 per cent. The iron was made from Ironton Townsite ore from the Cuyuna range. In furnishing high manganese pig iron the company has supplied whatever percentage of manganese the purchaser has specified, from one per cent. up.

George J. Simons, Berford Brittain and George W. English have opened offices under the name of Simons, Brittain & English, Inc., in the Oliver Building, Pittsburgh, to represent a number of manufacturers of steel furniture and fireproof office equipment.

The Canadian Parliament has appropriated $10,000 for experimental tests of low grade magnetic iron ores with a view to making pig steel direct therefrom. The experiments will be made by the Mines Bureau of the Department of the Interior, Ottawa.

PERSONAL

The Illinois Manufacturers' Association tendered a farewell dinner April 8, at the Congress Hotel, Chicago, to Edward N. Hurley, vice-chairman of the Federal Trade Commission, and, until his appointment, president of the association. Among the speakers were Senator James Hamilton Lewis, Theodore W. Robinson, vice-president Illinois Steel Company; Charles Piez, president Link-Belt Company, and Harry A. Wheeler, former president United States Chamber of Commerce.

Edward Wegmann and A. G. Hillberg have formed a partnership as Wegmann & Hillberg, consulting hydraulic engineers, with offices in the Park Row Building, New York. Mr. Wegmann was for more than 30 years connected with the construction of the Croton water works for the city of New York. He was the last chief engineer for the aqueduct commissioners and four years chief engineer of the Department of Water Supply, Gas and Electricity. Mr. Hillberg has been engaged in various hydroelectric developments, notably the Mississippi River Power Company's plant at Keokuk, Iowa. For the past two years he has been associate editor of the Engineering Record, in charge of hydraulics.

Prof. Hugo Diemer, State College, Pa., will have charge of the courses in scientific management and factory organization and administration in the summer quarter at the College of Commerce and Administration, University of Chicago.

Thomas A. Bennett, for the past five years in charge of the conveyor and elevator belt sales of the B. F. Goodrich Company, Akron, Ohio, has become assistant to the general sales manager of the New Jersey Zinc Company, with offices in New York City.

John Burke, New York, leaves this week for Panama to investigate reported large deposits of high grade manganese ore which were worked some 15 years ago.

Clarence M. Davison has resigned as assistant chief engineer of the Kennedy-Stroh Corporation, Oakmont, Pa., to become general manager of the Westbrook Elevator Company, Danville, Va.

William F. Gillies, formerly branch manager of the A. S. Cameron Steam Pump Company, has become manager of the Ingersoll-Rand Company, at Pittsburgh, Pa.

G. G. S. Lindsey, of Toronto, Canada, president of the Canadian Mining Institute, has gone to China on a six months' trip on mining business. He only recently returned from Europe.

B. D. Schram has been made chemist and engineer of tests at the Thurlow, Pa., plant of the American Steel Foundries, vice Arthur Haug, resigned.

Horace H. Lane, consulting and designing engineer, has moved his offices to the twenty-third floor of the Dime Bank Building, Detroit.

James A. Campbell, president of the Youngstown Sheet & Tube Company, Youngstown, Ohio, has returned from a vacation spent at Hot Springs, Ark.

H. Plaut, of the H. Plaut Trading Company, Rivadavia 1255, Buenos Aires, is at the Hotel McAlpin, New York, and wants to get in touch with manufacturers of steel and iron products.

J. Earl Meyers has been appointed manager of the Pittsburgh office of the Whitney-Kemmerer Company, in the Oliver Building in that city, dealer in pig iron, coal and coke. He succeeds Charles S. Bygate, resigned.

M. D. Flannigan, formerly general agent for the coal and ore department of the Pittsburgh & Lake Erie Railroad at Pittsburgh, controlled by the New York Central, has resigned, and is now connected with the sales department of the J. H. Hillman & Sons Company, producer of coal and coke, Oliver Building, Pittsburgh.

Col. Millard Hunsiker, sales manager for the Carnegie Steel Company in London, England, was in Pittsburgh last week and was tendered a dinner at the Pittsburgh Athletic Association. A. C. Dinkey, president Carnegie Steel Company, was host, and those present included officials of the company and a few invited guests. Colonel Hunsiker is vice-chairman of the Belgian relief committee in London, and stated that the task of sending food to the 2,500,000 destitute people in Belgium had been done very successfully.

William H. Warren has been appointed general superintendent of the open-hearth steel plant of the Brier Hill Steel Company, Youngstown, Ohio, succeeding Barton R. Shover, who went to India several months ago as general superintendent of the plant of the Tata Iron & Steel Company. Mr. Warren has been superintendent of the rolling-mill department of the Brier Hill Steel Company since the plant was built. Peter H. Brannon has been made superintendent of Grace and Tod furnaces of the Brier Hill Company, he formerly having been superintendent of Grace furnace only.

W. W. Vincent, who with V. Lee Alward organized the Vincent-Alward Company, Kenosha, Wis., to manufacture metal beds, springs, etc., three years ago, has become sole owner by purchasing the interest of Mr. Alward, who retires to again become associated with the Simmons Mfg. Company, Kenosha.

George H. Allen, president American Brass Company, Kenosha, Wis., was re-elected president of the Manufacturers' Association of Kenosha at the eighth annual meeting. Other officers elected are: Vice-president, Walter J. Frost, Frost Mfg. Company; secretary-treasurer, Conrad Shearer; executive committee, C. C. Allen, W. W. Vincent, Charles T. Jeffery, Z. G. Simmons and F. C. Hannahs.

William G. Conner, representing Dick, Kerr & Co., Ltd., London, England, spent last week in Cincinnati visiting the different machine-tool plants.

H. T. Barber will manage the interests of the stamping department of the Transue & Williams Company, Alliance, Ohio, in Michigan territory. His office is located at 915 Ford Building, Detroit.

Lee H. Parker, on January 1, became president of the Spray Engineering Company, 93 Federal street, Boston, Mass. He has had a wide experience in engineering, having been for a number of years with the General Electric Company, and for the past 10 years with the Stone & Webster Engineering Corporation. In representing for a considerable period important London interests in South America, he had an executive experience which particularly qualifies him for his present work.

R. W. Ellingham has resigned as works manager of the Hendee Mfg. Company, Springfield, Mass., manufacturer of Indian motocycles. He has been connected with the company in various capacities for the past 10 years. He intends to rest for about two months, in the meantime possibly taking a trip to the Panama-Pacific Exposition.

Frederick Ray has opened an office at 50 Church street, New York City, as consulting engineer, specializing in centrifugal pumping machinery, condensing equipment, cooling towers and similar apparatus.

Charles H. Schmalz, formerly assistant master mechanic of the Boston & Montana Reduction Department of the Anaconda Copper Mining Company, Great Falls, Mont., is now manager of the Billings Foundry & Mfg. Company, Billings, Mont.

G. J. Stock, formerly manager of the Stock Oil Fired Converter Company, is now the British representative of the Snyder Electric Furnace Company, Chicago, having sold out his interest in the former company. His office will be located at The Villas, Middleton St. George, Darlington, Durham, England.

George Rahmann, head of George Rahmann & Co., manufacturers of leather belting, 31 Spruce street, New York, was given a dinner at the Hotel McAlpin April 12 by the office and sales force of the firm, the occasion being the celebration of the twentieth anniversary of the establishment of the business.

OBITUARY

LIEUT. THOMAS W. FITCH, long prominent in the steel and wire trade, died April 8 at his home in Brooklyn, N. Y., aged 72 years. He had been a lieutenant in the United States Navy, participating in the Civil War, but retired in 1874, to engage in the wire business in St. Louis, becoming president of the Harrison Wire Company. In 1882 he organized the Harrison Steel Company to build a basic Bessemer steel plant in Illinois, near St. Louis, but was unable to secure a license under the Thomas & Gilchrist patents and the project was abandoned. In 1885 he went to Pittsburgh and with William Edenborn and Wallace H. Rowe founded the Braddock Wire Company, in which John W. Gates afterward became interested. Lieutenant Fitch was superintendent of the plant, which was located at Rankin Station. In 1891 he founded the Pittsburgh Wire Company, with plant at Braddock, and was the first president of the company, afterward serving as general superintendent. The company was taken over by the American Steel & Wire Company in 1898. Lieutenant Fitch then helped to organize the Pittsburgh Steel Shafting Company, which was purchased later by the Columbia Bridge Company, now the Columbia Steel & Shafting Company, and was for some time president of the latter company. He also assisted in the formation of the Braddock Machine & Mfg. Company. His wife, who was a daughter of Gen. W. T. Sherman, died about two years ago, and he then retired from business. He leaves two sons, Thomas W. Fitch, Jr., of Sewickley, Pa., and William Sherman Fitch, of New Mexico, and two daughters

WILLIAM F. PROCTER, who has been associated for 30 years with Egleston Bros. & Co., iron and steel merchants, 166 South street, New York, died April 6 at his home in this city. He held various positions with the firm up to 1899, when he became a partner. He leaves his widow. He had lived in New York but 30 days, having removed here from New Rochelle. The funeral was held April 8 from St. James P. E. Church, Brooklyn, of which Mr. Procter was a vestryman for a number of years.

HENRY W. POOR, banker and internationally known as the publisher of Poor's Manual, died suddenly April 13 at his home in this city, aged 71 years. He was born in Bangor, Me., and was graduated from Harvard University in 1865. He came to this city immediately after graduation and started in the banking and publishing business. He leaves his widow, two daughters and a son.

LEWIS A. COLVIN, superintendent of the Colvin Foundry, Worcester, Mass., died April 9, aged 50 years. He was born in Danielson, Conn., the son of James A. Colvin, for many years identified with the foundry business of Worcester. He leaves his widow and two children.

Arranging for the New Sheet and Tin Mill Scale

At a meeting held in Pittsburgh, April 8, between officials of the Amalgamated Association and owners of sheet and tin-plate mills in the Central West, it was determined that the method of examination of sales of sheets and tin plate in order to decide sheet and tin-mill wage rates shall be the same as has been in force for some years in the bar-iron scale. A committee for the Whitaker-Glessner Company, Newport Rolling Mill Company, Brier Hill Steel Company and National Enameling & Stamping Company will represent sheet mills, while a committee from the Trumbull Steel Company, Whitaker-Glessner Company and the National Enameling & Stamping Company will represent the tin-plate mills. These committees will meet a committee from the Amalgamated Association every two months. The average selling price on shipments by the mills that sign the Amalgamated scale for March and April will determine the wage rate for May and June. From March 22 to April 30, the men will work under a reduction of 11.2 per cent. in sheet mills and about 6 per cent. in tin-plate mills. Effective from May 1, wages will be determined in the manner noted above.

Employees in the sheet mills of the Whitaker-Glessner Company at Wheeling, W. Va., and Bridgeport, Ohio, are dissatisfied with the reduction in wages, and both mills shut down last week, to remain closed until the mill committees notify the company that they are ready to carry out the contract now in force with the Amalgamated Association. It is believed that the men will soon accept the situation and will then return to work.

Higher Sulphur Limit in Navy Castings

A modification in sulphur restrictions for steel castings is found in the new specifications, 49 S 1b, of the United States Navy for steel castings, indicating a change in opinion as to the extent to which sulphur is detrimental. The preceding specifications made the allowable maximum 0.05 per cent. sulphur in all carbon castings, grades A, B and C, and 0.04 per cent. in nickel steel castings, designated as "Special" grade. In the new specifications grades A and B are subdivided into two classes—A and D, the high carbon, and B and E, the medium carbon, respectively. A and B maintain the old limit of 0.05 per cent. sulphur and D and E permit castings to go as high as 0.07 per cent. sulphur. The two subclasses include castings of less importance than the others. For castings in grade C the limit is changed from 0.05 per cent. sulphur to 0.07 per cent. The nickel steel or special grade castings now have 0.05 per cent. instead of 0.04 per cent. sulphur as the limit. The changes enable the converter foundries more easily to compete for certain Government castings.

The requirements for tensile strength are reduced from a minimum of 90,000 lb. per sq. in. in nickel steel to 85,000 lb. The elastic limit stipulation is 45 per cent. of the tensile strength in carbon castings instead of a definite limit in pounds. The elongation requirements are advanced from 20 to 22 per cent. in the Special or nickel steel grade and the bending bar required is 120 deg. instead of 90 deg.

New Snyder Electric Furnace for England

The Snyder Electric Furnace Company, 53 West Jackson boulevard, Chicago, has closed a contract to install a Snyder electric steel furnace for the Daimler Motor Car Company, Coventry, England. It will have a daily capacity of four tons and will be operated on a refining basis melting cold material. The product of the furnace is to be used in castings for aeroplane motors, the company's product consisting of automobiles, trucks and aeroplanes.

Chicago Foundrymen's Club

The Chicago Foundrymen's Club held its April meeting at the Morrison Hotel, Chicago, April 10. The principal topic of the evening was presented in a paper by A. W. Lemme, Chicago Bearing Metal Company, on "Reclaimnig Brass Foundry Sweepings." C. E. Hoyt gave a brief review of partial results obtained in the making of a number of test heats of cast-iron borings and turnings, compressed into briquettes.

The Chicago, Burlington & Quincy has ordered five Mikado type locomotives from the Baldwin Locomotive Works in addition to the 50 of various types ordered recently. Three gas-electric locomotives have been ordered by an electric traction line from the General Electric Company. The Chicago & Northwestern is reported as inquiring for 50 locomotives.

As a result of the recently completed electrification of the Norfolk & Western Railroad west of Bluefield, W. Va., C. S. Churchill, assistant to the president, states that 11 electric engines have been able to replace 33 steam locomotives.

The Quadriga Mfg. Company, which makes metal stampings, dies, tools, washers, etc., has moved into its new factory, at 213-221 West Grand avenue, Chicago.

Pittsburgh and Nearby Districts

Reports that the National Malleable Castings Company, Sharon, Pa., had received very large contracts and would operate its plant to full capacity are untrue. The company states that business is a trifle better, but it is still far from being satisfactory, not enough orders being in hand to run to more than part capacity.

The Driggs-Seabury Ordnance Corporation, Sharon, Pa., states that in its drop forge and pressed steel departments it is running full, with enough work ahead for several months. It also has more work in its machine shops than for some time, but could handle a larger volume. The company states that it is now operating from 60 to 70 per cent. of capacity.

In March, stack No. 2 of the Republic Iron & Steel Company at Haselton, Ohio, had an average daily output of 459 tons, slightly larger than any previous record made by that furnace.

The billet and sheet-bar mills at the Farrell works of the Carnegie Steel Company made in March about 22,000 tons, and the output of the open-hearth department was about 32,000 tons. These figures are considered excellent, as the plant was not operated to capacity.

Stockholders of the LaBelle Iron Works, Steubenville, Ohio, met recently and re-elected officers as follows: W. D. Crawford, president; H. D. Westfall, vice-president; R. C. Kirk, secretary and treasurer; Gerry B. LeVan, general manager.

The Niagara Film Company, Marine Bank Building, Erie, Pa., is having plans prepared for a manufacturing plant which it will erect at an approximate cost of $150,000.

The Erie Lighting Company, Erie, Pa., which is building a transmission line to supply electric light and power to Waterford, Union City, Corry and vicinity, will construct a sub-power station in each of the towns mentioned.

The Pittsburgh Engineering Company, formed to engage in consulting engineering, has located in the House Building, Pittsburgh. It is composed of F. J. Denk, L. J. Schaedle and C. A. Schaedle, who have all had broad experience in their respective lines of engineering practice. Their field will cover power plants neering and general engineering, in addition to piping and accessories, steel-works and blast-furnace engi-layouts and general testing work.

Both blooming mills in the Bessemer steel plant of the Youngstown Sheet & Tube Company, Youngstown, Ohio, were in operation last week for the first time in several months. No. 1 blooming mill has been overhauled and repaired.

This week 9 out of 10 furnaces in the open-hearth steel plant of the Republic Iron & Steel Company, Youngstown, Ohio, are in operation.

The Republic Rubber Company, Youngstown, Ohio, has received a large foreign order for automobile truck tires which will keep its truck tire department busy for some time. The company states that the tires are not to be used for war purposes but are only for commercial uses.

The Warren City Tank & Boiler Company, Warren, Ohio, has placed a contract with the McClintic-Marshall Company, Pittsburgh, for the steel work for a modern plant to manufacture steel tanks of all sizes. The proposed building will be about 180 x 850 ft., of steel and concrete construction. About 1500 tons of steel will be used. The Warren City Company is in the market for equipment for the new building, such as cranes, plate punches and other machinery. The present plant is in full operation, day and night.

The offices of the Union Spring & Mfg. Company have been removed from the Oliver Building to the First-Second National Bank Building, Wood street and Fifth avenue, Pittsburgh.

Tod furnace of the Brier Hill Steel Company, Youngstown, Ohio, which was blown in last week, is making Bessemer pig iron, about half the product being washed metal, which runs very low in phosphorus and sulphur and is used in making high grades of steel. Its Grace furnace is making basic iron, which is used in the open-hearth steel plant at Youngstown. The company has given a large brick office building to its employees to be remodeled into a club house. The building will be equipped with shower baths, gymnasium apparatus and a well appointed library.

The Carnegie Steel Company, Pittsburgh, will soon ask for bids on a half dozen or more electric cranes for its proposed steel-tie finishing plant at the Homestead works, Munhall, Pa., and the company is also in the market for one large and one small crane for the Homestead works and the Shoen pressed steel wheel works.

The offices of the Charles T. Topping Machinery Company, dealer and contractor in mine and quarry equipment, have been removed from the Bessemer Building, to room 908, Oliver Building, Pittsburgh.

Reports that Pittsburgh and Wheeling capitalists had formed a company with a capital of $2,000,000 to build a tube mill at Tiltonville, near Martins Ferry, Ohio, cannot be confirmed. Consulting engineers in Pittsburgh and Wheeling say they know nothing of this project, and machinery builders make the same report. It is stated that if any such project is under way it has not matured to the point where bids have been asked on equipment or engineers asked to make plans.

Panama-Pacific Exposition Exhibitors

Among the exhibitors in the Palace of Manufactures of the Panama-Pacific International Exposition are the following:

Simmons Hardware Company, St. Louis, tool, cutlery and hardware.
E. C. Atkins & Co., Indianapolis, saws and saw guards.
Broderick & Bascom Rope Company, St. Louis, wire rope.
Henry Disston & Sons, Inc., Philadelphia, tools.
Meurer Brothers Company, Brooklyn, N. Y., tin roofing.
Mitts & Merrill, Saginaw, Mich., giant key seater.
Simonds Mfg. Company, Fitchburg, Mass., tools, steel disks.
Stanley Works, New Britain, Conn., shelf hardware, strip steel, etc.
Universal Caster & Foundry Company, New York City.
Wells Brothers Company, Greenfield, Mass., hardware.
Crane Company, Chicago, plumbing material.
Bristol Company, Waterbury, Conn., safety set screws.

Among the exhibitors in the Palace of Varied Industries are the following:

Meriden Cutlery Company, Meriden, Conn.
Novelty Cutlery Company, Canton, Ohio.
Crescent Tool Company, Jamestown, N. Y., pliers and wrenches.
Sargent & Co., New Haven, Conn., hardware specialties.
Malleable Iron Fittings Company, New Haven, Conn.

More Benzol Plants

The Northwestern Iron Company, First National Bank Building, Milwaukee, is building, in connection with its blast furnace and by-product coke plant, at Mayville, Wis., a benzol plant which, it is expected, will be in operation by May 1.

The Laclede Gas Light Company, St. Louis, Mo., which has under construction a large by-product coke plant, announces that in connection therewith it will at once begin the construction of apparatus for the manufacture of benzol. It is planned to have an annual capacity of 300,000 gals.

The mechanical goods department of the Goodyear Tire & Rubber Company, Akron, Ohio, broke its production and sales records in March. Over 1,000,000 ft. of hose was turned out, including fire hose, garden hose, steam hose, pneumatic tool hose, sand-blast hose, vacuum hose, and belting, packing, rubber springs, and soles and heels.

The Bridge Builders and Structural Society, 50 Church street, New York, reports that the tonnage of bridge and structural work closed throughout the country in March was 64 per cent. of the entire capacity of the various bridge and structural shops.

Machinery Markets and News of the Works

RAILROADS IN THE MARKET

Foreign Buying Shows Slight Falling Off

Evidence of Better Domestic Business Is Seen Although Improvement Is Irregular —Plants Busy on Orders

While new foreign demand has subsided somewhat in the past few days, it is now seen that the war orders which have been booked exceed all estimates. Evidence of a betterment in domestic trade continues to appear, but home buying is still irregular. In New York the Seaboard Air Line has entered the market to replace machinery destroyed by fire. New England machinery plants are on double shift, as a rule, and skilled labor is scarce. Cleveland finds that both foreign and domestic business is lighter, though the war business is still flourishing. The market continues to broaden steadily in Detroit and the foundries there are well engaged. In Chicago railroads are coming forward as buyers. Foreign orders are keeping some of the Milwaukee plants busy, but general business is irregular. The domestic machine-tool trade continues to improve in Cincinnati. In Dayton some of the manufacturers are busier than at any time in four years. The demand for boilers and tanks is good in the Central South. No betterment in the machine-tool trade is shown in St. Louis. Small orders are coming out fairly well in the Pacific Northwest and the development of a United States Government railroad in Alaska is regarded hopefully.

New York

NEW YORK, April 14, 1915.

The destruction by fire of the Portsmouth, Va., machine and blacksmith shops of the Seaboard Air Line has caused that company to take quick action in putting out inquiries for new machine tools and equipment. To save time the company, in some instances, simply revived inquiries for machine tools which had been on file for over a year. Many months ago the company issued a large list, but action on it has been repeatedly deferred, two of the reasons having been uncertainty as to the freight rate decision, and then the slack business which followed the outbreak of the European war.

There is a slight cessation of orders emanating from war needs, but there are good prospects and current business is at least normal. In the case of foreign trade it is found that some of the English builders of machine tools are in a better position with regard to deliveries and can give approximately the same delivery as American manufacturers.

Georges M. Haardt, director general of the Mors Automobile Company, Paris, France, who arrived here recently, is buying tools for his company and also for his government. Fears that France will be a poor customer after the war because of the large quantities of tools which have been placed there in recent months are believed to be unfounded by those who have given thought to the subject. It is pointed out that the French arsenals were lacking in equipment and that with all they have taken since the war began they will need more, while the automobile factories will have a great period of prosperity in replacing the thousands of cars and trucks which have been ruined in war operations. Again, many of the machines sold abroad, especially lathes, have been more or less special machines with short beds, and cannot take the place of standard tools.

The Bethlehem Steel Company is contemplating further purchases of machine tools and the call has gone out for the salesmen of several companies to appear at Bethlehem with data as to deliveries, etc.

The American Locomotive Company, which has been a heavy buyer of late, preliminary to taking up the manufacture of munitions of war in this country, is having some of the machines it purchased sent to Richmond, Va. The company is making shrapnel at its Canadian plant.

The Kern Commercial Company, an export and import house at 114 Liberty street, New York, has received a number of inquiries for woodworking and metal working machinery for export to Italy and Spain and wishes to receive catalogues and quotations from manufacturers.

The Brooklyn Bolt & Forging Company, Vandyke and Van Brunt streets, Brooklyn, manufacturer of galvanized pole line hardware, recently incorporated with a capital stock of $10,000 by E. F. and J. S. Quicke and J. E. Winkler, all of East Stroudsburg, Pa., is building a factory for the manufacture of telephone, telegraph and electric transmission line materials; machine, carriage, lag, stud and track bolts, and street railway track tie rods. A forging and machine shop will be erected for the manufacture of light hammer forgings. The capital stock of the company will probably be increased. The forging and galvanizing shops are completed, and the machine shop and warehouse are about half complete. Most of the bolt-making machinery has been purchased; but inquiries are out for considerable other equipment which is needed. The company will also specialize in jobbing galvanizing.

The Turner Construction Company, 11 Broadway, New York City, has been awarded the contract for the construction of a reinforced concrete factory for the American Lead Pencil Company, 320 Fifth avenue, New York. The building will be located on Willow street, Hoboken, N. J., and is 42 x 68 ft., nine stories and basement. Work will be undertaken at once. Franklin M. Small, 265 Broadway, New York City, is the architect.

The Syracuse Heater Company, 409 Snow Building, Syracuse, N. Y., manufacturer of warm-air furnaces, etc., plans to add the manufacture of a patented device for increasing the efficiency of such furnaces. F. R. Butters is manager.

Binghamton, N. Y., will receive bids until May 15 for a cross-compound pumping engine of 10,000,000 gal. daily capacity. John D. Davidson is secretary of the board of water commissioners.

The Turner Construction Company, Prudential Building, Buffalo, has received contract for the erection of a four-story and basement reinforced concrete factory, 80 x 200 ft., for the Buffalo Meter Company, Main street and the Erie Railroad, to cost $125,000. Geo. H. Bassett, 290 The Terrace, is president.

The Bison Electrical Company, Buffalo, has been incorporated by F. M. Smith, B. H. Fisher and Joseph T. Arundell, 259 Pearl street, to do a manufacturing and contracting business in electrical supplies. The capital stock is $25,000.

The C. Klinck Packing Company, Buffalo, is building a cooling plant, 78 ft. square, two stories and basement, at its plant at Depot street and the Erie Railroad. The total estimated cost with equipment is $20,000.

The plant of the Nairn Paper Mill Company, Dansville, N. Y., was destroyed by fire recently with a loss of $15,000.

William Barnet & Son, Albany, are having plans prepared for a factory 60 x 335 ft., three stories, of reinforced concrete, to be erected at Rensselaer, N. Y.

The Leroy Salt Company, Leroy, N. Y., is building a salt refinery, 75 x 80 ft., three stories and basement.

The Anchor Furniture Company, Holmes street, Jamestown, N. Y., has completed plans for a four-story and basement addition to its plant, 40 x 60 ft.

The Turner Construction Company, 11 Broadway, New York City, has been awarded the contract for the construction of a reinforced concrete warehouse and manufacturing building for Colgate & Co. The building, which will be located at Greene and York streets, Jersey City, N. J., is 96 x 200 ft., eight stories, and work will be begun at once. Warren Davey, chief engineer of Colgate & Co., is the architect.

Mark & Mohl, Inc., 273 Russell street, Brooklyn, N. Y., ornamental and structural iron and steel worker, expects to purchase the following machine tools for its new plant, and desires prices and catalogues covering them: One small quick-action punch with throat about 20 in. deep, capacity ⅝ in. in ⅜ in. arranged with three plungers so that three punches can be inserted at one time and only one punch at a time used if so required; one circle shear to cut plates up to ⅝ in. thick; one upright drill, capacity 1-in. holes, distance from post to center of drill approximately 20 in.; one bolt-threading machine; capacity up to 1¼-in.; one small circular saw.

Philadelphia

PHILADELPHIA, PA., April 12, 1915.

E. E. Hollenback, Fifteenth and Race streets, Philadelphia, Pa., has been awarded the contract for a two-story brick factory to be erected at Columbia avenue and Hancock streets, for D. L. and H. W. Short, and C. W. Brenizer, at an estimated cost of $14,000. R. W. Pollock, 1802 Chestnut street, is the architect.

Peuckert & Wunder, 310 Chestnut street, Philadelphia, are drawing plans for a two-story and one-story brick factory, to be erected at Hagerstown, Md., at an estimated cost of $50,000.

The Megargee Paper Mill Company, Modena, Pa., will shortly break ground for another paper mill. W. W. Christie, Paterson, N. J., is the architect.

The American Die & Tool Company, Second and Buttonwood streets, Reading, Pa., has completed the construction of the one-story factory of galvanized iron, 32 x 80 ft., and has installed about $20,000 worth of machinery to fully equip it. E. Sternbergh is general manager.

Contract has been awarded to the Harrison C. Rea Company, 1027 Wood street, Philadelphia, for the construction of a one-story brick machine shop, 40 x 180 ft., to be erected at Second street and Lehigh avenue. Watson & Huckle, 1211 Walnut street, are the architects.

The Old Virginia Orchard Company, Front Royal, Va., will equip a cold storage plant with a capacity of 30,000 bbl.

The Citizens' Crystal Ice Company, Roanoke, Va., will equip an ice factory with a capacity of 60 tons a day. G. W. Chaney is buyer.

New England

BOSTON, MASS., April 13, 1915.

So much has been said about machinery business resulting from the war that to state that it has been underestimated may seem an exaggeration. Nevertheless such is the case. As everyone knows all works which build machine tools used in the manufacture of ammunition, including shrapnel and larger projectiles and which enter into the making of small arms and general arsenal equipment, are pushed to the extreme limit of production. These companies are employing the resources of their less fortunate machine-tool friends, and also machine shops in general.

The total output is exceedingly high. Overtime is so common an experience as to pass unnoticed. Double shifts prevail in a large percentage of the big plants. Little is said of these conditions. It is safe to say that some of these great plants would accept double the volume of their present business if they had the capacity; also, the prices at which these machines have been sold are high, the basis being what may be termed productive profit. The great trouble in most places where machine shops are situated is the growing scarcity of skilled labor. In some cities and towns really good men cannot be found. This condition, however, does not apply to unskilled labor.

The Morgan Spring Company, Worcester, Mass., has awarded the contract for a four-story factory, 72 x 86 ft.

The contract has been awarded for the truck-assembling building of the Locomobile Company, Bridgeport, Conn., which will be 50 x 103 ft., one story.

The contract is about to be let for the additional factory building of the Union Mfg. Company, New Britain, Conn. The plans call for a structure 47 x 160 ft., five stories, of mill construction.

Work has begun on the additions to the plant of Landers, Frary & Clark, New Britain, Conn., which were to have been erected last fall. A tinning building will be 30 x 140 ft., and a forge shop 40 x 125 ft., both one story.

The Electric Lighting Company, Salem, Mass., plans to install shortly a new 6250-kw. generator, four new 758-hp. boilers with Taylor stokers, practically doubling the capacity of its plant at an approximate cost of $750,000.

Chicago

CHICAGO, ILL., April 13, 1914.

Canadian inquiry for machinery has been a feature of export business in this market in the last week, the Canadian Car & Foundry Company figuring largely. The steady growth in the domestic demand for machine tools for industrial service has also been maintained. In addition three of the railroads have at last come into the market for substantial lists of tools. The Missouri, Oklahoma & Gulf Railroad, through the Arnold Company, engineer, Chicago, is inquiring for nearly 50 machines, including lathes, drills, boring mills, milling machines, boiler-shop and wood-working equipment. The Burlington is asking for quotations on approximately 70 machines, which include heavy presses, forge shop equipment, heavy duty drills, shapers, a battery of engine lathes, vertical turret lathes and boring mills, together with a complete wood-working shop installation. The Santa Fe has an inquiry out for some 10 machines, the more important of which are three engine lathes, two vertical boring mills and a large planer.

The Nelson Brothers Company, Saginaw, Mich., manufacturer of gasoline engines, pump jacks and feed mills, advises that it is in the market for molding machines, an overhead trolley system for its foundry, a cupola, blowers and some additional machine-tool equipment.

The Atlas Brass Mfg. Company, Chicago, has been incorporated with a capital stock of $10,000 for the operation of a foundry and the finishing of brass castings. The incorporators are B. J. Braheney, 4011 West Van Buren street; F. P. Roy and A. M. Hoy.

The Marquette Electric Engineering Company, Chicago, has been formed, with a capital stock of $15,000 by Adolph C. Anderson, Edwin A. Fritsch and Hugo Fritsch, 2148 Wellington avenue, to manufacture electric machinery and supplies.

E. H. Stroud & Co., 55 West Kinzie street, Chicago, manufacturers of machinery, have had plans prepared for a two-story factory, 26 x 65 ft., to be erected at 928 Fullerton avenue, at a cost of $5000.

Plans for an engine and boiler house for the Mayfair pumping station, Chicago, have been prepared by Charles W. Kallal, city architect. Each building is to be 60 x 236 ft.

The Tool & Appliance Company, Chicago, has been organized and will engage in manufacturing. The company may be reached in care of J. J. Bolger, 501 South Clinton street.

The Joliet Forge Company, Joliet, Ill., has been incorporated with a capital stock of $50,000 and will make a general line of forgings within moderate limits of weight. The incorporators are John J. Sharpe, William and Edward F. Sharpe.

The Northern Brass Mfg. Company, Waukegan, Ill., has increased its capital stock from $25,000 to $75,000.

The Paramount Stove Works, Quincy, Ill., has been incorporated by Don Hoover, A. J. Tansman and H. F. Miller to manufacture stoves and furnaces. It has an authorized capital of $40,000.

Carl Heckman, Freeport, Ill., is establishing a public garage and repair shop.

Peoria Heights, Ill., will receive bids until April 19 for two pumps. E. J. Brayton is village clerk.

The Blue River Power Company, Seward, Neb., will purchase within the next few months water wheels, generators, about 25 miles of transmission lines, etc. Burdette Boyes is secretary.

P. Melchiors, proprietor of a machine shop at 1218 Howard street, Omaha, Neb., will erect an addition to his plant.

The Rath Packing Company, Waterloo, Iowa, is preparing to install considerable additional modern machinery at its plant.

Lewis Brothers, New Leipzig, N. D., will build an addition to their machine shop which will double its capacity.

Plans are being prepared by P. M. Olson, Duluth, Minn., for a steel-clad machine shop of fireproof construction for the Dell Development Company, Duluth.

The Minnesota Fibre Bottle Company, Minneapolis, Minn., has awarded the contract to S. M. Klarquist & Son for the construction of a two-story brick factory at 65 Twenty-second avenue, Northeast, to cost about $30,000. C. A. Boehme is the architect.

The Minneapolis Steel & Machinery Company, Minneapolis, Minn., is in the market for two cranes.

Gillette, Wyo., will erect a municipal electric lighting plant.

Milwaukee

MILWAUKEE, WIS., April 12, 1915.

The irregularity of trade and the inequality of the distribution of new business create reports of considerable variance. Some manufacturers insist that business is improving at a satisfactory rate, while others can see no encouragement in the situation. Tool builders are maintaining a high rate of production, principally on export orders, but find little consolation in domestic inquiry. The employment situation, a good index on general conditions in the metal-working industries, shows improvement from week to week, and is losing the spasmodic touch it has borne for many months. This indicates a more settled condition. General conditions, as reflected by retail automobile buying, are better than a year ago, and distributors anticipate a 35 to 40 per cent. increase over 1914 sales. Little new business is being developed in the heavy machinery industry.

John F. Dornfeld, president of the defunct Dornfeld-Kunert Company, Watertown, Wis., structural erector and boilermaker, purchased the assets at receiver's sale for $13,319; the creditors will realize about 20 per cent. on this basis. Mr. Dornfeld has not made public his intentions with regard to the disposition of his purchase.

The Automatic Trip Carrier Company, Rice Lake, Wis., has become associated with the Collis Factory, Clinton, Iowa, in the organization of a third company, the Silage King Mfg. Company, which is to be selling agent for the ensilage cutters and litter carriers formerly manufactured by the first mentioned company, but now to be produced in the Clinton shops. The Automatic Company holds $15,000 and the Collis Company $3000 of the stock in the new corporation. The works at Rice Lake will be devoted principally to the manufacture of potato growers' implements and machinery, but several new implements are now being perfected.

The Erni Mitchell Laundry Machine Company, Pewaukee, Wis., has been moved to Oconomowoc, Wis., where the principal financial interest is held. The Pewaukee shop building is being removed in sections and rebuilt at Oconomowoc, and a large addition will be made. B. G. Edgerton is president; Gunder Anderson, vice-president; H. Kirk White, secretary, and E. H. Hewitt, treasurer.

The Wisconsin Autowriter Company, Milwaukee, recently incorporated, is negotiating with several small cities within a radius of 50 miles of Milwaukee for a location for its proposed plant. The autowriter is a metal device for use in penmanship instruction.

The Steiner Mfg. Company, Chilton, Wis., manufacturer of gasoline engines and farm implements, has decided to move to Plymouth, Wis. It is capitalized at $80,000 and Plymouth capital has taken a $15,000 interest. The change is made principally for the benefit of shipping facilities. The former Maxwell Hearse Body Company shop is provided for shop and office purposes, possession being given the Steiner Company outright.

The Four Wheel Drive Automobile Company, Clintonville, Wis., which is running day and night shifts on large orders from the allied nations of Europe, is seeking a considerable number of skilled workmen and is buying new machines as rapidly as operators are assured. A total investment of $25,000 in new tools and other machine-shop equipment will be made. It is seeking a new site upon which to build a larger plant.

The Simmons Mfg. Company, Kenosha, Wis., has made an offer to the city to take over the municipal waterworks pumping station and site by giving in exchange seven acres of land and $25,000 in cash. The Simmons Company now owns practically all of the land surrounding the pumping station, which is inadequate for the city's needs. The offer will probably be accepted and a new pumping station constructed.

The Federal Pressed Steel Company, Milwaukee, Wis., will construct a $10,000 addition to its plant.

C. I. Danielson, 617 University avenue, Madison, Wis., has sold his machine shop to E. N. Phillips and O. D. Smart, who will continue the business on a larger scale.

Indianapolis

INDIANAPOLIS, IND., April 12, 1915.

The La Porte Outing Sulky Company, La Porte, Ind., is in the market for some second-hand foundry equipment with motor drive for three-phase, 60-cycle, 110-volt current.

The Anderson Button Attaching Machine Company, Anderson, Ind., has been organized by Joseph F. Fadely, Albert E. Tolin and Earl Berkebile, with $50,000 capital stock. It will manufacture special service machines.

Fire at the plant of the American Road Machinery Company, Ft. Wayne, Ind., caused a loss of about $15,000.

The Nurre Mirror Plate Mfg. Company, Bloomington, Ind., will build an addition to its factory at a cost of $50,000. J. N. Nurre is manager.

The plant of the George McCord Milling Company, Oakland City, Ind., was destroyed by fire last week with a loss of $20,000.

Cleveland

CLEVELAND, OHIO, April 12, 1915.

Inquiries for machine tools for making war material continue to come out in good volume. The company at Dayton, Ohio, which has been buying a large amount of equipment for time fuses for shrapnel is still in the market and is reported to have an inquiry out for over 100 small turret lathes. Considerable inquiry for lathes for the same purpose is coming from the East, but buyers seem to find it almost impossible to secure the deliveries wanted and in same cases second-hand machinery will be purchased. A large amount of war material is still being figured on in this territory. The foreign demand for machine tools has eased off somewhat. While large domestic orders for machines used for war purposes are not as plentiful as they were, scattered buying has increased, so that the total volume of business is holding up well. Outside of war orders the general demand for small lots of machine tools is fairly good. In electrical equipment there is an active demand for small motors and generators, but no inquiry for large units. Local engineering firms report that a large amount of work in new manufacturing plants and additions is being figured on.

The Cleveland Machinery & Supply Company, Cleveland, has been formed with a capital stock of $50,000 to deal in machinery, machine tools and supplies. Stanley W. Sparks, formerly manager of the supply department of the Cleveland Tool & Supply Company, William E. McNaughton and John O'Brien are actively interested in the company. Temporary offices have been opened at 58 and 59 Wade Building.

The Hendrickson Machine Company, Cleveland, has increased its capital stock from $12,000 to $40,000.

The National Screw & Tack Company, Cleveland, will shortly enlarge its plant by the erection of a one-story machine shop. Some additional equipment will probably be required.

The Burr Mfg. Company, Cleveland, has taken over the Silver Ray Lamp Company, and has moved into the latter company's plant at 1307 East Fortieth street. It will manufacture industrial lighting units, in addition to its former line of tackle blocks, pressed-steel garden rakes, wire stretchers, etc.

The France Stone Company, Second National Bank Building, Toledo, Ohio, will erect a large stone-crushing plant near Kenton, Ohio.

The Elyria Tire & Rubber Company, Elyria, Ohio, will shortly begin the erection of a brick, steel and concrete plant, 80 x 106 ft., for the manufacture of hard rubber tires for automobile trucks.

The Buckeye Aluminum Company, Wooster, Ohio, has awarded a contract for a two-story brick and concrete addition 44 ft. square.

The Victor Specialty Company, Canton, Ohio, will enlarge its plant by the erection of a three-story addition providing 8000 sq. ft. floor space, and will add to its present line of specialties the manufacture of metal toys. It has increased its capital stock from $50,000 to $100,000.

The Ohio Tractor Company has been placed in the hands of Charles H. Lewis as receiver. It is stated that the assets of the company will probably be sufficient to pay the debts.

Shelby, Ohio, will erect a municipal lighting plant. Plans and specifications will be prepared by the Burchard, Roberts, Wales Company, Cleveland.

The Shelby Wire Company, Shelby, Ohio, has been incorporated with a capital stock of $35,000 by S. I. Armbruster, and others.

The Delphos Metal Stamping Company, Delphos, Ohio, has been incorporated with a capital stock of $30,000 to manufacture sheet-metal fence posts and other products. O. G. Hackendorn, F. Z. Altenberger, Paul J. Snyder, and others, are the incorporators. The J. M. Robinson Mfg. Company is building two large metal-working machines for it.

Plans for an addition to the plant of the Faultless Rubber Company, Ashland, Ohio, are being prepared by the Osborn Engineering Company, Cleveland.

The McArthur Concrete Pile & Foundation Company, 11 Pine street, New York City, has been awarded the contract for the foundation of the new assembling building and power house for the Willys-Overland Company, Toledo, Ohio.

Detroit

DETROIT, MICH., April 12, 1915.

The volume of business here continues satisfactory. Transactions are mostly in single tools and small orders, but the total sales are considerable. The automobile industry is absorbing a fair quantity of tools, but the market is broadening steadily and almost all lines of business are represented to some extent. Special machinery is in good demand. A large number of bonding propositions involving waterworks and electric lighting plants were put before the voters at the spring elections last week, but results were disappointing to the trade as the majority of the propositions were defeated. The second-hand machinery trade is comparatively dull. Foundries continue well engaged. The volume of new construction work reported last week was not particularly impressive.

The Detroit Steel Products Company, Detroit, manufacturer of steel sash and automobile springs, has increased its capital stock from $500,000 to $1,250,000. It reports an excellent volume of business, both departments being operated on a 24-hr. basis. Two additions have been made to the plant since January 1.

The Bigelow-Cooper Company, Bay City, Mich., has been organized with $150,000 capital stock to manufacture lumber and wood products. It has acquired a site and will at once proceed with the erection of a flooring plant, planing mill, etc. The incorporators are Charles A. Bigelow, D. M. Kneeland and James Cooper.

The American Steel Adjustable Screen Door Company, Battle Creek, Mich., has been incorporated with $50,000 capital stock to manufacture a line of steel screen doors. It will erect and equip a plant shortly. The incorporators are N. E. Hubbard, Arthur Walker and R. G. Rock.

The Michigan Trust Company, Grand Rapids, Mich., has been appointed receiver in bankruptcy for the Racine-Truscott Shell Lake Boat Company, manufacturer of launches and ship builder, which operated three plants.

The Yale Company, Yale, Mich., recently organized to manufacture chemical fire extinguishers, is erecting a factory.

The Kuhlman Electric Company, Elkhart, Ind., will locate in Bay City, Mich. Plans are being drawn for the company's new plant which will be about 60 x 275 ft. The company manufactures all kinds of electrical equipment.

The Nelson Brothers Company, Saginaw, Mich., manufacturer of gas engines, pump jacks and feed grinders, will double the capacity of its plant by the erection of two additions, each 90 x 150 ft., of brick construction. One addition will be used as a foundry and the other as a warehouse. Other departments will be enlarged accordingly.

W. E. Culver and W. M. Schulz, Iron River, Mich., will establish a machine shop and brass foundry.

The Stearns Lumber & Salt Company, Ludington, Mich., is erecting two additions to its wood-working plant.

The Grand Rapids Blowpipe & Dust Arrester Company, Grand Rapids, Mich., has purchased a site and will build an addition to its plant.

The Campbell, Wyatt & Cannon Foundry Company, Muskegon, Mich., has bought the plant of the Pyle Foundry Company, adding 35 tons daily to its capacity, and 88,000 sq. ft of available floor space. Cylinder castings are the principal product.

Dayton

DAYTON, OHIO, April 12, 1915.

With few exceptions manufacturers in Dayton are busier than they have been in four years. The almost sudden improvement is due to the orders received by numerous concerns for different kinds of war munitions. Chief among these orders is one for a detonating device for shrapnel shells, and it is authoritatively stated that the order will total about $15,000,000. A number of Dayton firms will participate in the manufacture of these devices, while others are understood to have contracts with the Canadian Car & Foundry Company for machining shrapnel cases that have been ordered from a Dayton car builder. It is denied that the United States Government is encouraging the manufacture of war munitions in Dayton with a view of taking over certain plants for establishing a permanent arsenal at that point. Credence may be attached, however, to the report that a South American Government has lately been in negotiation with different companies with the idea in view of placing some large orders. It is stated that most of the war orders received lately are for shipment to Russia.

The Dayton Rubber Mfg. Company, Dayton, is considering making an extension to its plant. Details as to the necessary equipment are not available.

The Edgemont Machine Company, Dayton, maker of lathe chucks and other machine tool specialties, has lately received a sufficient number of orders to enable it to put on a night force.

The Barney & Smith Car Company, Dayton, has received an export order for special forgings that will total $1,250,000. It has lately ordered a number of forging presses and other equipment for its forging plant. A night force will be employed as soon as the new equipment is received.

It is currently reported that the Maxwell Motor Car Company, Dayton, is contemplating an addition to its plant in North Dayton, for which considerable equipment will be required.

The C. W. Hoffritz Sales Company, Dayton, has been incorporated with $10,000 capital stock by C. W. Hoffritz and others. It will establish a garage and repair shop.

Confirmation has been received of plans of the Middle West Supply Company, Columbus, Ohio, a company having a large Government printing contract, to locate its plant in Dayton, instead of Columbus, as previously noted. The plant of the Mercantile Corporation Company has been leased, and very little new equipment will be required.

It is rumored that the Osterlind Printing Press & Mfg. Company, Minneapolis, Minn., is considering moving its plant to Dayton.

Recent orders received by the National Cash Register Company, Dayton, have enabled it to put on practically a full force on four days' time, instead of three days, as formerly.

The Recording & Computing Machines Company, Dayton, has received a contract for shrapnel shell timers that is estimated to run over $12,000,000. The company, of which W. H. Homer is president, has acquired the old plant of the Speedwell Motor Car Company, and is installing new machinery. An addition to this plant, recently mentioned, is now under rush construction.

The Dayton Polish Company, Dayton, recently incorporated with $10,000 capital stock, will establish a plant on Bacon street for the manufacture of wood and metal polishes.

The Dayton Mfg. Company, Dayton, has received an order for approximately 200,000 metal packing boxes, and is adding to its equipment.

It is reported, but not confirmed, that the Monarch Spring Company, 2108 Senate avenue, Indianapolis, Ind., is considering removing its plant to Dayton.

Cincinnati

CINCINNATI, OHIO, April 12, 1915.

The domestic machine-tool trade shows considerable improvement. Most of the business, however, that has been transacted lately can be traced to firms who are adding to their equipment for the purpose of filling war orders. With the exception of a few tools that will be needed for equipping the new repair shops of the Chesapeake & Ohio Railroad, at Lexington, Ky., little railroad business is in sight. A large number of inquiries are still out for lathes and milling machines, but the question of making deliveries on time is a vexing one. It is understood that lathe manufacturers have been able to advance prices lately, though the extra expense incurred in rushing work has doubtless offset this advantage to a large extent.

Quite a large number of local machine-tool builders are in attendance at the National Metal Trades Association's annual convention in New York. The number is larger than usual as many members are taking advantage of the opportunity to confer with their export agents.

Considerable improvement is found in the boiler and tank business. Portable electric drilling machines and grinders are also in demand, and one local firm booked one export order for 125 pedestal grinders to be shipped to Russia. An inquiry has been sent out for 50 electric bench drills for export shipment, and it is expected to be closed this week. With the exception of rebuilt lathes the second-hand machinery business is quiet.

The Burgett Varnish Works Company, Cincinnati, recently incorporated with $10,000 capital stock, will erect a plant in Norwood, a Cincinnati suburb.

The Early & Daniels Company, Cincinnati, has let contract for a grain elevator to be erected on Sixth street.

It is currently reported, but not confirmed, that the American Tool Works Company is having plans prepared for a plant to be erected on Pearl street. The company owns the former I. & E. Greenwald foundry and shop.

S. S. & G. H. Godley, architects, Cincinnati, have completed plans for a garage and repair shop to be erected for the Alms & Doepke Company.

The Reliance Engineering Company, Cincinnati, has contract for making an addition to the power plant of the Martinsville Electric Light Company, Martinsville, Ind. It is understood that practically all of the necessary equipment has been purchased.

The American Rolling Mill Company, Middletown, Ohio, has let contract for several large forging presses. It is also reported that the company intends to increase its machine shop capacity by the addition of a number of lathes and other equipment.

The Paul A. Sorg Paper Company, Middletown, Ohio, has increased its capital stock from $500,000 to $1,000,000, and will make an addition to its plant at an early date.

Payne & Elkenberry, Hamilton, Ohio, contemplate the construction of a large grain elevator for which equipment will be required.

Orders recently received by the Niles Tool Works, Hamilton, Ohio, have enabled it to employ a full force in its machine shop. Its foundry is also operating almost up to capacity.

The Emery Safety Wheel Company, Springfield, Ohio, has lately received sufficient business to enable it to employ a full force and on full time.

The Whittaker-Glessner Company, Portsmouth, Ohio, has awarded contract to the Pittsburgh Construction Company, Pittsburgh, Pa., for an addition to its galvanizing plant that will be 150 x 300 ft., one story, of steel construction.

The Modern Tool, Die & Machine Company, Columbus, Ohio, has been incorporated with $25,000 capital stock, and will fit up a plant. John F. Cahill, 216 North Fourth street, Columbus, is one of the incorporators.

The Central Ohio Oil Company, Columbus, Ohio, will establish a distributing plant at Chillicothe, Ohio, for which tank equipment will be required.

The Central South

LOUISVILLE, KY., April 12, 1915.

One of the most encouraging indications is the improved demand for boilers. Trade of this kind has been extremely scarce for several months, but the boiler manufacturers report that orders have lately been quite satisfactory. Tank business of various sorts has helped out also, so that many of the shops are now running at almost capacity. The improvement may be only a spurt; but it is hoped that it indicates a return to normal conditions in the power equipment field. On the other hand, electric motors are reported to be quiet. Oil engines are in good demand for small lighting plants and other public service properties, and numerous sales of this class of equipment are reported. Ice machinery, which was in fair demand a short time ago, is a dead proposition at present, the season being too far advanced now to permit much new business to develop. Machine tools are reported in good demand.

The American Creosoting Company, Columbia Building, Louisville, awarded contract to the Henry Vogt Machine Company, Louisville, for a boiler for a new plant at Russell, Ky.

The American Street Cleaning Machine Company, Louisville, has been incorporated with $15,000 capital stock to manufacture sweeping and cleaning machines. Arthur E. Whitting, E. H. Heaverin, and others, are stockholders.

The ice factory of J. B. Rollins, Carrollton, Ky., was burned April 6 with $8000 loss. Decision regarding rebuilding will be made shortly.

The New Haven Lighting Company, New Haven, Ky., is purchasing additional generating equipment. It has placed an order with Fairbanks, Morse & Co. for a 25-hp. oil engine.

Fred Hunt's Machine Shop, Somerset, Ky., will buy some wood-working machinery, including a planer, matcher and molder, as well as an 8 x 10 in. steam engine or gasoline engine with belt or gear-driven pump.

The flour mill and axe-handle factory of the Poynter Mfg. Company, Marrowbone, Ky., was burned recently with a loss of $10,000.

The Columbia Lighting Company, Columbia, Ky., will install a 30-kw. generator and a 50-hp. oil engine within the next few months. A. H. Ballard is buyer.

The Dawson Light & Power Company, Dawson Springs, Ky., is building an addition to its power house and is installing a 100-kw. generator, belted to a 150-hp. Skinner engine. E. A. Stevens is manager.

The Greenup Electric Company has been organized at Elizabethtown, Ky., with $10,000 capital stock. It is already operating several electric light plants, and plans to establish others at Sonora and West Point, Ky.

The Starkey Electric Company, Somerset, Ky., has been awarded an electric light franchise at Whitesburg, Ky., and will put in a plant to develop 100 hp. The estimated cost of equipment, for which the company is now in the market, is $6000.

The Bristol Brick Company, Bristol, Tenn., is reported to have plans for enlarging the capacity of its plant. A. C. Honaker, Abingdon, Va., is president.

H. W. Foote, Manchester, Tenn., is in charge of the reconstruction of the electric light plant of the Tennessee Valley Light & Power Company.

Bolinger Brothers, Martel, Tenn., will install a sawmill and planing mill. The equipment will include a 60-in. circular saw. A rope cableway for handling the timber will also be constructed.

Cline & Burnett, Crossville, Tenn., will spend $2500 for power and wood-working equipment for a beer stave mill with a capacity of 5000 staves a day.

The mill of the Tennessee Producers Marble Company, Knoxville, Tenn., was burned recently with a loss of $100,000. B. L. Pease can advise regarding rebuilding plans.

Frank H. Phillips, Cleveland, Ohio, has purchased a site in Chattanooga, Tenn., where he will erect a factory for the production of core wood fiber for use in the manufacture of cast-iron pipe. Motor-driven machinery will be installed. The wood fiber is intended to be used instead of hay.

W. J. Barton, president of the chamber of commerce, Johnson City, Tenn., has information regarding the establishment of a wood-working plant there.

St. Louis

ST. LOUIS, MO., April 12, 1915.

The machine-tool business continues to drag along with no noteworthy increase in volume. Dealers are confident that improvement is due before very long, but they are somewhat disappointed that the change for the better has been so long coming. Some business is going on in replacement of tools and some inquiry is in hand for single tools. No lists are coming out of any individual consequence. Second-hand tools are in rather light request, but are not moving any better than new machinery. Collections are reported good and banking conditions favorable to business extension whenever investors acquire the nerve to go ahead.

The Martha Investment Company, St. Louis, Mo., will erect a $50,000 factory at 4400-18 Union boulevard, to be occupied on completion by the St. Louis Paper Can & Tube Company.

The Curtis Mfg. Company, St. Louis, Mo., is in the market for shrapnel forgings.

A fire on April 7 caused about $75,000 damage to the plant of the Banner Buggy Company, St. Louis, and some wood-working equipment will be required for replacement.

The St. Louis Felling Machine Company, St. Louis, Mo., has been incorporated with a capital stock of $50,000 by Edward Mallinckrodt, E. K. Ludington, James Whitelaw, Charles L. Knower and Adolph H. Stille to manufacture blind-stitch sewing machines.

The Waters-Walch Mfg. Company, St. Louis, Mo., has been incorporated with a capital stock of $25,000 by Nathan R., Edmund T. and J. Clifford Waters to manufacture typewriter supplies.

The National Double Tire Company, St. Louis, Mo., has been incorporated with a capital stock of $16,000 by William Geist, George W. Milius and Adolph Schlesinger to manufacture automobile tires, accessories, etc. Equipment is being sought for a plant.

The Young Mfg. Company, St. Louis, Mo., has been incorporated with a capital stock of $16,000 by Joseph P. Young, John J. Woods and Ernest L. Schroeder and will equip for the manufacture of kaolin products.

The Sterlin Transport & Auto Company, St. Louis, Mo., has been incorporated with a capital stock of $12,000 by Jacob Hagelstein, Richard Mederacke and Gustave Koerner.

The St. Joseph Amusement Company, St. Joseph, Mo., will equip a theater to cost about $100,000, and will require some mechanical apparatus.

The Edward W. Kirk Soap & Cleaner Company of Kansas, has been authorized to use $62,000 of its capital of $300,000 in a plant at Edina, Mo.

O. Rumsey, Bismarck, Mo., and others, have plans for an ice-making and refrigerating plant with an output of about 25 tons of ice daily.

The Holekamp Lumber Company, Webster Groves, Mo., has increased its capital stock from $50,000 to $75,000 and will enlarge its output of lumber, etc.

The Cellular Lath Company, St. Louis, Mo., has leased quarters for a plant at 5126 North Second street, St. Louis, Mo., and will install a plant for the manufacture of a patented fireproof fiber lath.

The Hil-Ko Rim Lock Company, Railway Exchange Building, St. Louis, recently incorporated, will establish a plant for the manufacture of a rim lock for automobiles. Frank D. Hiller, Jr., is president.

The Milde Brothers, Jackson, Mo., will erect a garage and automobile repair plant.

J. A. Anderson, Rich Hill., Mo., will equip a garage and repair plant, and is reported in the market for machine tools, etc.

Chillicothe, Mo., is receiving bids for pumps, motors, filter plant equipment and other waterworks machinery. Harper & Stiles, Kansas City, Mo., are the engineers in charge.

The Blytheville Steam Laundry Company, Blytheville, Ark., is reported in the market for a 40-hp. power plant. G. W. Pyles is manager.

A waterworks plant will be equipped at Marshall, Ark., by A. B. and C. B. Johnson, who are reported in the market for machinery.

The Arkansas Handle Company, Little Rock, Ark., 1700 East Fifteeenth street, will replace its plant, burned with a loss of about $10,000.

A franchise has been voted to Cooper Davis, Butler, Okla., for an electric light and power plant. He is in the market for machinery.

The Maloney Tank Company, Sapulpa, Okla., will equip a plant at Tulsa, Okla., for the manufacture of large portable steel tanks.

The Williams Iceless Refrigerator Company, Claremore, Okla., has been incorporated with a capital stock of $25,000 by Edward M. Williams, Lee Settle and A. E. Streeter to manufacture refrigerators.

The Carr Safety Appliance Company, Oklahoma City, Okla., has been incorporated with a capital stock of $50,000 by S. C. Carr, B. E. Chaplin and C. F. Dyer.

George H. Walker, P. O. box 518, Muskogee, Okla., is in the market for hydraulic cottonseed oil mill machinery.

R. W. Harris, Meridian, Miss., is reported in the market for equipment to manufacture nail keg headings.

The Natchez Fish Company, Natchez, Miss., will install a freezing and raw-water ice plant of 25 to 30 tons capacity, the plant to be driven by an oil engine.

The sawmill of J. W. Bibofi, Bogalusa, La., has been burned with a loss of about $5000. It will be replaced.

The Crescent Bed Company, New Orleans, La., is in the market for an auxiliary drilling head, equipped with two spindles at one in. centers.

The sewerage and water board, New Orleans, La., will receive bids until April 19 for additions to the pumping station.

Catalogues Wanted

The plant of the Panama Sash & Door Company, New Basin Canal and Anthony street, New Orleans, La., which was destroyed recently with a loss of about $50,000, is being rebuilt. It is in need of some wood-working machinery; but has not decided between electrical drive or steam-engine drive. Catalogues to replace its files destroyed in the fire are greatly desired. F. E. Martinez is president.

Texas

AUSTIN, TEXAS, April 10, 1915.

Splendid reports of rapidly increasing business come from the machinery and tool trade this week. One concern in San Antonio is preparing to enlarge its plant in order to properly care for the increasing demand for oil-well-drilling machinery and equipment, due to the development of the new field at Thrall and the general activity in boring prospect wells in different localities of central and southern Texas.

G. W. Ford, Chicago, and associates, plan to build a brick plant at Mexia, to be equipped with natural gas burners.

The San Antonio Foundry Company, San Antonio, has been organized with a capital stock of $30,000 by C. V. and C. E. Dilley and N. M. Karney.

The plant of the Longview Ice & Electric Company, Longview, recently purchased by the American Public Service Corporation, will be enlarged.

An electric lighting system will be installed by the Post Power Company, Post, Texas.

Plans are on foot at Slaton to construct a municipal waterworks plant to cost about $15,000.

The Central Oil Company will build an oil refinery at Corsicana. E. G. Edel is manager.

The Farmers' Mill & Gin Company, Tivoli, will build a mill and gin. G. W. Bissett is interested.

Fred Fries, city clerk of San Antonio, will receive bids April 19 for the construction of a pumping station for the sanitary sewer system.

F. W. Ritter, who has purchased the holdings of the Lordsburg Electric, Ice & Water Company, Lordsburg, N. M., will enlarge and make improvements.

L. C. Friend, Tucson, Ariz., plans to install pumps and hydraulic equipment to cost about $150,000 upon his placer mining property.

The Eighty-five Mining Company, Lordsburg, N. M., will install an electric hoist at its mine.

The Texas Interlocking Cement Star Silo Company will build a plant at Greenville for manufacturing cement silos.

Theodore Rogge and Rudolph Goesch, Floresville, will build a cotton gin to cost about $10,000.

The construction of an electric power house is involved in the plans of B. Q. Musgraves, Ft. Worth, and associates, for the construction of an interurban railway between Marfa and Ft. Davis.

The Alamo Iron Works, San Antonio, is having plans drawn for an enlargement of its plant.

The Pacific Northwest

SEATTLE, WASH., April 6, 1915.

Small orders for machine tools are coming out in fairly satisfactory number; but very little inquiry is found for tools of an important nature. Manufacturers of logging equipment note a seasonable improvement; but this business continues far below what it should be at this time of year, and the situation in the lumber industry is not altogether encouraging. A few good-sized orders are coming out for hydroelectric and steam-power machinery, although comparatively few really important projects in this line are being carried out. The mining interests in eastern Washington and Idaho are becoming a more important factor in the market than for some time, and a good volume of business is coming from Alaska in mining and dredging machinery. A great deal of encouragement is derived from the preparations for the United States Government's railroad development in Alaska. Some large shipments of machinery from Eastern points are passing through Pacific ports on the way to Vladivostok and the Orient, and local manufacturers are also getting some good inquiries from the Orient.

The Boise-Payette Lumber Company, Boise, Idaho, is building a new machine shop, and has placed its order for a complete outfit with the Portland Machinery Company.

W. L. Bessolo, formerly of San Diego, Cal., and F. Terazio, Portland, Ore., are starting a shop on First street, near Burnside street, Portland, for the manufacture of machinists' tools. They expect to employ about 20 men.

The plant of the Union Furniture Mfg. Company, Albany, Ore., has been taken over by A. C. Girard, Montesano, Wash., who will remodel and improve it. New machinery and equipment will be installed.

The sawmill plant and timber holdings of the Goodrich Call Lumber Company, Lavine, Mont., have been purchased by B. L. Gunnary, manager of the Gunnary Collins Lumber Company, Absher, Mont. The new company will be known as Gunnary Collins Company, and a number of improvements and alterations will be made.

The Prairie Power Company, Prairie City, Ore., contemplates moving its power plant and will make some improvements at that time.

The fruit-packing plant of the Drager Fruit Company, Salem, Ore., which was completely destroyed by a recent fire, with a loss of about $40,000, will be rebuilt. Fred Drager is manager.

The box factory of the Orr Lake Lumber Company, Bray, Ore., which was completely destroyed by fire recently with a loss of about $35,000, will be rebuilt.

The Central Point Packing Company, Portland, Ore., which has been reorganized, plans improvements to its packing plant.

The Billings Implement Company, Billings, Mont., has begun work on the construction of its brick factory, 65 x 75 ft., which will cost about $20,000.

The Bonners Water & Light Company, Bonners Ferry,

Idaho, is having plans prepared for a new pumping plant, with a capacity of 250 gal. per min.

Announcement has been made that the Central Montana Elevator Company, Columbus, Mont., of which W. H. Haight is superintendent, will build another grain elevator of 40,000 bu. capacity.

The Silverton Lumber Company, Silverton, Ore., will close down and completely remodel its mill. New machinery will be installed, including an electric tractor system at the docks.

The DeSmet Valley Lumber Company, Tekoa, Wash., which was recently incorporated by J. Y. Waller, Howard Williamsen, and others, with a capital stock of $50,000, plans to build a mill and dry kiln in Tekoa.

I. W. Mason, Aberdeen, Wash., has organized a company which will construct a factory for the manufacture of a patented leveling device.

The Dominion Silver Lead Mining Company, Colville, Wash., has been incorporated with a paid-up stock of $100,000 by W. H. Linney, Spokane, and others. It will expend approximately $25,000 in improving its mines, including the installation of air compressors, pumps, hoists, conveyors and special machinery.

Cunningham & Riner, contractors, Seward, Alaska, announce that they have secured a site and will begin the erection of a pressed brick factory.

J. D. Fields, Helena, Mont., announces that a company, of which he is president, will begin work in June on the construction of two plants for the production of phosphate fertilizer, one at Philipsburg and the other at Maxville, Mont.

The Coin Machine Mfg. Company, 722 Corbett Building, Portland, Ore., has awarded contract to the James Taylor Company for the erection of a two-story brick factory, to cost exclusive of machinery, about $15,000. T. Irving Potter is president and manager.

Eastern Canada

TORONTO, ONT., April 12, 1915.

The railroad earnings in Canada are beginning to show the effect of the improvement in general trade conditions. Gross earnings are still below those of the corresponding periods of 1914. Net earnings, on the other hand, are showing a decided improvement, those of the Canadian Pacific for February being $507,438 larger than for the same month a year ago. The net earnings of the Canadian Northern increased by $42,800.

The Canadian Blower & Forge Company, Ltd., Berlin, Ont., has been incorporated with a capital stock of $500,000 to manufacture engines, heating, ventilating and drying apparatus, blowers, forges, drills, punches, shears, etc. It will take over the assets of the Canadian Buffalo Forge Company, Ltd. The incorporators are William H. and Henry W. Wendt, John M. Chipman and Charles A. Booth, all of Buffalo, N. Y., and Allan G. McAvity, Montreal.

The Bedford Mfg. Company, Bridge street, Bedford, Que., is to erect an implement factory. Gray & Dunn, 14 St. John street, Montreal, have the contract.

The Dominion Government is to erect a workshop at the dockyard, Halifax. Information can be obtained from the Consulting Naval Engineer, Department of Naval Service, Ottawa.

The St. Clair Foundry Company, Toronto, is to enlarge its factory.

The Rubber-Regenerating Company, of Canada, Ltd., has been incorporated with a capital stock of $200,000 to manufacture rubber goods of various kinds. The head office is at Montreal, and the incorporators are Charles M. Holt, Errol M. McDougall, Gilbert E. Stairs, and Pierre F. Casgrain, all of Montreal.

The harbor commissioners' shed, Montreal, which was destroyed by fire on March 29, contained 36 electrically-operated hay presses.

The Franklin Steel Works, Joliet, Ill., is to open a branch factory in Hamilton, Ont., for the manufacture of toe calks for horseshoes. A company with capital stock of $40,000 is to be incorporated. W. F. Pitcher, Franklin Steel Works, Joliet, will be treasurer and manager.

Bruce Stewart & Co., Charlottetown, P. E. I., are to rebuild their foundry and blacksmith shop.

Harry Brothers, Markdale, Ont., are to purchase a 40-hp. boiler.

Price Brothers & Co., paper and pulp manufacturers, are, it is said, to abandon their sawmills at Rimanski, Que., and construct larger ones at Chicoutimi, Que.

The Spanish River Lumber Company, Sudbury, Ont., whose sawmill and boiler house at Cutler, Ont., were recently destroyed by fire, has decided to erect a two-band saw-mill with horizontal resaw. The loss by the fire was $100,000.

J. H. Tromanhauser & Co., Temple Building, Toronto, are preparing plans for the proposed new 500,000-bu. elevator at Owen Sound, Ont.

The Borden's Condensed Milk Company is to erect a cold-storage plant at Tilsonburg, Ont. J. Cooney is superintendent.

Tara, Ont., is to install an electric light and power system. W. J. Taylor is town clerk.

The Swift-Canadian Company, St. Clair avenue, Toronto, is to make an addition to its packing plant.

The grist mill of the Pryne Milling Company, Brussels, Ont., was destroyed by fire March 28, with a loss of $20,000.

Herbert Moisley, Thorold, Ont., is erecting a planing mill.

Motors are being installed in the plant of the Collingwood Shipbuilding Company, Collingwood, Ont. There will be further additions later.

The House of Commons has voted $50,000 for printing presses, linotype machines, monotype machines, ruling machines, and a printing and book-binding plant generally for the Government Printing Bureau, Ottawa.

P. A. Seeker, Marine City, Mich., has purchased land at London, Ont., for an automobile factory to cost $65,000.

Ottawa, Ont., is to purchase four pumps for the waterworks plant on Lernieux Island. R. L. Haycock is waterworks engineer.

The increased stock of $1,020,000 of the Canadian Consolidated Rubber Company, Ltd., Montreal, recently issued, will be used for extending its manufacturing facilities.

The House of Commons has voted $110,000 to equip the locomotive and power shops at Moncton, N. B., for the Intercolonial Railway. It has also voted $23,000 for power plants at divisional points.

It is the intention of the Canadian Hart Wheel Company, Hamilton, Ont., to erect a plant at Dundas, Ont.

The Brantford Computing Scale Company, Brantford, Ont., is to erect a two-story addition to its factory at a cost of $20,000.

A brass foundry is to be started in St. John, N. B., by Eagles, Hogan & Sterling.

The Guelph Tire & Rubber Company, Ltd., Guelph, Ont., has been incorporated by Alexander H. Davidson, Southampton, Ont., and others, with capital stock of $350,000, to manufacture rubber goods. It has purchased the business of the Independent Tire Company, of Toronto, Ltd.

Bermite Explosives, Ltd., Montreal, has been incorporated with a capital stock of $200,000 to manufacture ammunition, gunpowders and explosives. Carlton W. Berry, Waterloo, Que.; Charles Watt, Lachine, Que.; Egbert W. Westover, Montreal; Frederic T. Enright and Charles M. Cotton, both of Westmount, Que., are the incorporators.

The Canada Machinery Corporation, Ltd., Galt, Ont., is increasing its capital stock from $1,500,000 to $2,000,000.

The Premier Electric Company, Ltd., Montreal, has been incorporated with a capital stock of $49,000 to manufacture automobiles, etc. Louis A. David, L. E. A. D. Mailhiot, S. H. R. Bush, John L. Hutcheon and Edward C. Baker, all of Montreal, are the incorporators.

Canadian Wallboard Company, Ltd., Toronto, has been incorporated with capital stock of $50,000. Alfred Bicknell and T. S. H. Giles are the incorporators.

The Intercolonial Railway is to erect a coal plant at Levis, Que., to cost $75,000. E. P. Gutelino, Moncton, N. B., is general manager.

The Fire & Light Committee of Newmarket, Ont., has been authorized by the Town Council to purchase a 15-hp. electric pump for the waterworks.

Western Canada

WINNIPEG, MAN., April 10, 1915.

Business in machinery is quiet, and the outlook for the coming weeks is only fair. Money is still somewhat scarce, and the usual spring preparations for new industries and additions to established ones are lacking. It will probably require the assurance of a good grain crop to brighten the industrial situation, and a crop is never certain until it is safely harvested and housed. Quiet as the situation is, it is said that it is better than many expected a couple of months ago. A demand for machinery parts always exists and not very much falling off in that class of trade is looked for this season.

Raven & Mann, New Westminster, B. C., are preparing to erect a lumber mill on the Fraser River.

Camrose, Alberta, contemplates purchasing a steam condenser to connect up with a 75-hp. engine; also an induction regulator for a 2400 volt 60-cycle current.

Government Purchases

WASHINGTON, D. C., April 12, 1915.

Bids were received by the Bureau of Supplies and Accounts, Navy Department, Washington, on April 6, for supplies for the Navy Yards as follows:

Schedule 8018, Construction and Repair, Class 41, Mare Island—One mechanically-guided cutting device—Bid 59, $510.

Schedule 8052, Construction and Repair, Class 111, Philadelphia—One double punch and shear—Bid 11, $1735; 34, $1687; 45, $2075, informal; 91, $1755, $1170 and $1825; 96, $1957; 103, $1710; 109, $2052; informal; 123, $1825; 128, $1897; 131, $1985; 137, $1775; 142, $2815; 146, $1811; 158, $1900; 184, $1764, informal, and $2060, informal; 188, $1894.

The names of the bidders and the numbers under which they are designated in the above list, are as follows:

Bid 11, Birch & Co.; 34, Buffalo Forge Company; 45, Cleveland Punch & Shear Works; 59, Davis-Bournonville Company; 91, Hilles & Jones Company; 96, Huntington Machine & Foundry Company; 103, Kemp Machinery Company; 109, Massillon Foundry & Machine Company; 123, Manning, Maxwell & Moore; 128, R. S. Newhall & Sons Company; 131, Niles-Bement-Pond Company; 137, D. Nast Machinery Company; 142, Henry Pels & Co.; 146, Prentiss Tool & Supply Company; 158, Scully Steel & Iron Company; 184, Williams, White & Co.; 188, Wickes Brothers.

Trade Publications

Diamond Core Drills and Air Lift Pumping.—Sullivan Machinery Company, 122 South Michigan avenue, Chicago, Ill. Bulletins Nos. 65-C and 71-A. The first gives complete estimates for various types of steam, electric and hand power diamond core drills. Suggestions on selecting a drilling outfit and illustrations of a complete outfit and a drill in operation are included. The second takes up Sullivan air lift pumps and well heads, giving detailed descriptions, diagrams and illustrations of the pumps in operation. The theory of air pumps is explained and definitions of standard terms used in air lift work are included.

Automatic Scales.—Toledo Scale Company, Toledo, Ohio. Catalogue and leaflets. Describes the construction of several types of automatic scales for platform, hanging and counter use up to 2500-lb. capacity. Illustrations of the scales in use with testimonials are included.

Vises and Trucks.—Globe Vise and Truck Company, Grand Rapids, Mich. Catalogue No. 8 and booklet. The first describes Globe Metal-light steel trucks for factory, shipping room and warehouse use. The booklet covers the company's line of bench vises. Both are illustrated with views of the different trucks and vises, a separate page being given to each style with tables of dimensions underneath.

Gas Meters, Regulators and Appliances.—Equitable Meter Company, 422 First avenue, Pittsburgh, Pa. Catalogue. Concerned with proportional and dry gas meters and ones for natural gas containing gasoline, pressure and volume gauges, regulators, parts, etc. Descriptions, dimension diagrams and tables and illustrations of the various meters are included.

Cranes.—Whiting Foundry Equipment Company, Harvey, Ill. Wall hanger. Contains a reprint of the rules for the operation of cranes issued by the National Founders' Association. A brief list of the different types of cranes and other equipment made is included.

Pneumatic Hoists.—Northern Engineering Works, Detroit, Mich. Bulletin No. 33. Presents illustrations and brief descriptions of a few types of pneumatic hoists. Dimension tables and a diagram showing the amount of air required per foot of lift are presented, and mention is made of other pneumatic lifting appliances, such as compressed air jacks, foundry elevators of the direct lift and compounded types and traveling and jib cranes.

Castings.—Denver Brass Works, 1221 Twelfth street, Denver, Col. Folder. Contains a list of the products of the foundry and machine departments of the company, which include castings in brass, bronze, aluminum, copper and alloy bronzes; bearing metals, bushings, welding sticks, name plates and signs and machine finished products, such as valves for special purposes, metal working tools, hose couplings, nozzles, etc. A table showing the properties and uses of the ordinary metals and special bronzes is included.

Boiler Room Specialties.—Lagonda Mfg. Company, Springfield, Ohio. Booklet T-1. Describes and illustrates several types of boiler tube cleaners and boiler quick repair tools and also covers a line of automatic cut-off valves and multiple strainers. The views of the cleaners show them in actual use.

Aluminum Solder.—Wilkes-Barre Welding Company, 6 West Ross street, Wilkes-Barre, Pa. Circular. Describes a solder which runs at a very low temperature and can be applied by a gasoline torch.

Drill Chucks.—Jacobs Mfg. Company, Hartford, Conn. Catalogue, tenth edition. Explains the construction and mechanism of drill chucks up to 1-in. capacity for use with electric and pneumatic drills. Instructions are given as to the method of taking the chucks apart and cross-sections of both regular and flat back models are shown.

Insulating Materials.—Mica Insulator Company, 68 Church street, New York City. Bulletins Nos. 78, 79, 80 and 82. Three of these cover the uses of Micanite plate, commutator rings, cloth, paper, tubing and washers as insulation for traction and airbrake motors. Bulletin No. 80 is concerned with various oiled insulating materials, including cloth, paper, linen, silk and tape.

Stationary Engines.—Buckeye Engine Company, Salem, Ohio. Catalogue. Illustrates horizontal and vertical, simple, compound and tandem compound engines for heavy service up to 4000 hp. The special claims for the Buckeye engines are set forth in some detail and there are also included tables of power calculations made on a basis of varying initial steam pressure and showing the horsepower developed in each case.

Valves.—Jenkins Bros., 80 White street, New York City. Catalogue No. 20. Takes up brass, iron, steel and composition valves of various types for a wide variety of uses, and includes steam traps, speed governors, gauge cocks and water gauges. Illustrations and cross-sectional diagrams of several styles of valves are presented.

Wire Rope.—Hazard Mfg. Company, Wilkes-Barre, Pa. Price list. Gives the construction and cross-section of various types of wire rope for a wide variety of uses with especial attention to oil and gas well wire lines. Tables giving the approximate breaking strain, dimensions, weights, etc., are included.

Piston Pumps.—Scranton Pump Company, Scranton, Pa. Bulletin No. 101. Illustrates and describes single and duplex cylinder piston pumps for boiler feed, tank and general services where clear liquids are required to be pumped at any pressure up to 150 lb. per sq. in. It also contains a list of parts for piston pumps and directions for setting up and operating.

Metal Spinning Lathes and Wood Working Machinery.—P. Pryibil Machine Company, 512 West Forty-first street, New York City. Catalogues Nos. 11 and A-11. The first describes and illustrates two types of metal spinning lathes for round work, lathes for oval work and oval chucks and slide rests, drills and taps, head and tail stocks and spinning tools. The Pryibil polishing and buffing lathe is also described. The second catalogue, which is a loose leaf one, takes up and illustrates several types of band, circular, swing and jig saws, boring and mortising machines and cross cut and rip gauges. A band saw filing machine and a circular saw setting machine are included. A feature of the saws is that there is absolute control of all adjustments including tilting and locking of table from the front of the machine.

Firebrick.—Henry Maurer & Son, 420 East Twenty-third street, New York City. Catalogue. Describes and shows by diagrams the standard shapes and sizes of firebrick, tiles, slabs and blocks, cupola and bosh brick and baker's tiles and blocks.

Corrugating Machinery.—O. O. Poorman Company, New Bremen, Ohio. Two catalogues. Contain detailed descriptions and illustrations of double removable die roll corrugating machines for roofing and siding; corrugating machines for culvert rolls; roofing machines; irrigating pipe machinery; eaves trough machinery; imitation brick siding roll machinery; roofing and toggle presses; crimping machines and paint and paint mixing machines. It is claimed that the Poorman method of rolling corrugated roofing material gives better results and greater production and that the feature of removable dies doubles the life of a machine. Included is a list of firms using these machines.

Hose Racks and Drains.—Jiffy Fire Hose Rack Company, 727 Seventh avenue, New York City. Catalogue. Describes and illustrates a line of racks for unlined linen and cotton rubber lined hose, valves, Siamese connections and caps, couplings, nozzles, fire extinguishers, hose and drains and gutters. The rack enables the hose to hang vertically, and by a pull on the nozzle, the supporting pins turn and throw the hose on the floor. Illustrations showing this feature of the racks are presented. Mention is made of a line of drains and gutters for use in wooden and concrete floors. In connection with the illustrations of the drains, brief specifications and a statement of the dimensions are included.

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